LOWER COOK INLET MEROPLANKTON

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I. SUMMARY

This study is a contribution to the understanding of quantitative seasonal changes of eggs and larvae of fishes and shellfishes of major economic significance in Lower Cook Inlet. Early life history stages of important components of the food webs of Lower Cook Inlet, Kachemak Bay, and Kamishak Bay have been identified. Temporal and spatial dynamics and distributions of important ecosystem components, the ichthyoplankters and meroplanktonic stages of shrimps and crabs, have been tabulated, depicted, and described. Timing and use of specific areas within Lower Cook Inlet by early life history stages of fishes, shrimps, and crabs have been tabulated, depicted, and evaluated.

II. INTRODUCTION

A. Nature and Scope

This study was planned as a reconnaissance-level survey of early life history stages of fishes, shrimps, and crabs in Lower Cook Inlet. The study was intended to obtain knowledge of the quantitative temporal and spatial changes in composition of dominant organisms.

B. Objectives

The objective of this study was to use MARMAP methods to contribute to an understanding of quantitative seasonal changes of eggs and larvae of fishes and shellfishes of major economic significance in Lower Cook Inlet. Specific objectives are:

1. Identify early life history stages of important components of the food webs of Lower Cook Inlet, Kachemak, and Kamishak Bays.

2. Describe temporal and spatial dynamics and distributions of these important ecosystem components, specifically ichthyoplankters and meroplanktonic stages of shrimp and crabs.

3. Evaluate timing and use of specific areas within Lower Cook Inlet and its bays by these early life history stages of fishes, shrimp, and crabs.

III. CURRENT STATE OF KNOWLEDGE

An annotated literature review has been compiled (Tables 1, 2, and 3) of references relevant to species in the Lower Cook Inlet meroplankton. Most of the references, many dealing with areas outside Cook Inlet waters (Appendix A), have been used to identify the fish eggs, fish, crab, and shrimp larvae of commercial or ecosystem importance.

Meroplankton research in Kachemak Bay, Lower Cook Inlet, and Kamishak Bay is relatively recent, coinciding with current interest in petroleum exploration. Damkaer (1977) studied the holozooplankton in this region, so did not identify commercially or ecosystem important decapod larvae or planktonic fish eggs and larvae.

Haynes and Wing (1977) studied the king crab *(Paralithodes camtschatica)*, bumpy shrimp *(Pandalus goniurus)* and northern pink shrimp *(Pandalus borealis)* distribution and abundance in Inner and Outer Kachemak Bay. Their observations suggest that the major releasing sites for king crab and the two species of pandalid shrimp are in the central and southern portions of Outer Kachemak Bay. The greatest abundance of stage I larvae of king crab and bumpy shrimp occurred during the May 10-13 sampling period. Larvae of northern pink shrimp were apparently released earlier, since 59% of the larvae collected during May 10-13 were already stage II.

In studies of post-larval king crab by Sundberg and Clausen (1977) in the Kachemak Bay area, the greatest number of crabs collected by skimmer trawl and suction dredge occurred along the shoreline between Anchor Point and Bluff Point, the northern border of Outer Kachemak Bay, and they were associated with water less than 27 m, rocky substrates, and abundant epifauna.

Alaska Department of Fish and Game (1975), Barr (1970), Greenwood (1959), and Ronholt (1963) have each reported on the commercially important species of shrimp and crabs in the Kachemak Bay-Lower Cook Inlet area.

A recent comprehensive summary of literature pertaining to the effects of petroleum on marine organisms and environments is Malins (1977).

IV. STUDY AREA

The study area is Lower Cook Inlet, Alaska. The sampling station locations were more widely spread in 1976-1977 than in 1978 (Figures 1, 2a and b, Tables 4 and 5).

V. SOURCES, METHODS, AND RATIONALE OF DATA COLLECTION

All samples of early life history stages of fishes, shrimps, and crabs were taken from project vessels in and near Lower Cook Inlet, Alaska. All seasons were sampled at 10 station locations from 6 April 1976 to 26 February 1977. Spring, summer, and autumn were sampled at 32 station locations from 19 May to 27 September 1978.

In 1976-1977, 10 routine sampling locations were established in the Lower Cook Inlet region (Figure 1). Seven cruises were made from April 1976 through February 1977; bad weather prevented sampling four stations (Table 6).

Plankton samples were obtained by using open bongo nets in double-oblique hauls using MARMAP[1] methods. The diameter of the nets was 60 cm and the mesh sizes were 333 and 505 μm. The volume of water filtered was estimated as the product of the area of the net opening and the distance measured by a calibrated flow meter in the mouth of each net. The assumption was implicit that the efficiency of filtration was 100%. If one flow meter failed, the other meter reading was used; in two instances, when both meters failed, an estimate was made using the duration relative to other hauls.

The samples were sorted to remove fish eggs, fish larvae and juveniles, shrimps, and crabs. In most cases the entire sample was examined; subsamples were taken when organisms in a group were very abundant.

The organisms were identified to the lowest practicable taxonomic category and life history stage. The concentrations of the organisms were recorded and reported in data submissions destined for the National Oceanographic Data Center, as abundance per cubic meter, with a minimum concentration of 0.001.

The concentrations of organisms taken with paired 333 and 505 μm meshes did not appear to differ as might occur with extrusion of small organisms or with escapement of large organisms (Figure 3). Therefore, the catches of the paired nets for each haul were combined as the geometric means of the two concentrations. Those mean concentrations per cubic meter were transformed, based on the depth of each sample, to abundance per 10 square meters for graphical and tabular presentations (Appendix B). The mean concentrations were also transformed to abundance per 1000 cubic meters (Appendix C).

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[1]Smith, Paul E., and Sally L. Richardson. 1977. Manual of methods for resource survey and appraisal. Southwest Fisheries Center. Administrative Report No. LJ-77-11. 233 pp.

A rule for rounding was used such that any observation greater than O was rounded up to 1.

The geometric mean abundance per 10 square meters was plotted at station locations for each season for abundant groups of fishes, shrimps, and crabs (Appendix D). The appropriate life history stages were summed within each station and the geometric mean computed over cruises for the spring and summer seasons in which more than one cruise was made.

The annual abundance per 10 square meters was plotted at station locations for abundant groups of fishes, shrimps, and crabs (Appendix E). The annual abundance was computed as the sum of organisms in specified categories within each station over seven cruises.

In 1978, 32 station locations were sampled between 19 May and 27 September in Lower Cook Inlet. Three station locations were in Inner Kachemak Bay, 9 in Outer Kachemak Bay, 11 in Lower Central Cook Inlet, and 9 in Kamishak Bay (Figure 2b). Seven cruises were made; bad weather prevented sampling some station locations on all cruises (Table 7).

In 1978, two vessels were used. The *Humdinger* is a 37-foot troller, chartered by OCSEAP and used in open water stations; the *Whaler* is a 21.5-foot boat. Zooplankton and ichthyoplankton were sampled during most cruises on board the *Humdinger* with a bongo net ina double-oblique tow. The bongo net consisted of a double-mouthed frame, each mouth with an inside diameter of 60 cm and a mouth area of 0.2827 m^2, made of fiberglass and weighing about 95 lb. A 50-lb cannonball weight was attached to the bottom of the frame. A 505 µm mesh net with an open area ratio (OAR) of 8:1 and a 333 µm mesh net, 8:1 OAR, were attached to the frame. PVC collecting cups and collars were attached to the cod ends of each net.

Beginning on 13 August, additional samples were taken at each station with a neuston net. The neuston net consisted of a stainless steel box frame with a mouth opening 50 cm wide by 30 cm (area 0.15 m^2), weighing about 25 lb. A 505 µm mesh net with 8:1 OAR was attached to the frame.

A Hydro-Products winch was used to deploy the nets on the *Humdinger*. The winch did not have a power-out capability, so the MARMAP-required deployment for bongo nets of 50 m/min was estimated. There was a 30-second sinking time and a retrieval rate of approximately 40 m/min, the slowest speed the winch would operate without stalling. Ship speed was adjusted to seek a 45° wire angle during sinking and re-trieval. Towing speed was approximately 2 knots. Sampling depth was generally within 10 m above the bottom to the surface. The fishing depth of the net was determined by the product of the cosine of the wire angle at depth and the amount of wire out. Volumes of water filtered were estimated using ship's speed until the 11 August cruise, when a flow meter was attached in each mouth opening of the bongo frame.

A 20 cm diameter bongo net with mouth area 0.0314 m^2 was towed from a davit mounted on the port side of the Whaler. The net frame was similar in construction to the 60 cm bongo, but smaller scale and made of PVC plastic pipe. On one cruise, four inshore stations were sampled using nets with meshes of 165 μm and 333 μm. New nets of 505 μm mesh were used thereafter. A small Hydro-Products winch was mounted forward. A 10-lb lead weight was attached to the end of the line below the net. The drum is free-wheeling on the winch so wire was played out at approximately 50 m/min by controlling speed with the hand brake. The net was towed at the slowest speed the engines on the *Whaler* could be idled, about 2 knots. Retrieval rate was approximately 30 m/min, the slowest speed the winch would run. Other procedures were similar to those of the 60 cm bongo net.

Nets were washed down on board the *Humdinger* with a hose attached to a low-pressure salt water pump, while those aboard the *Whaler* were washed by pouring seawater over them. Samples were preserved on board the vessels with sodium borate buffered 4% formalin. Within 24 hours, samples were represerved with a fresh solution of 4% formalin, propylene phenoxytol, and propylene glycol.

The catches of fishes, shrimps, and crabs by bongo nets at each station location on each cruise have been expressed as abundance per 10 m^2 for graphical and tabular presentations (Appendix F); the abundance per 1000 m^3 was also computed (Appendix G). The catches by neuston nets have been expressed as abundance per 1000 m^3 (Appendix H).

The geometric mean abundance per 10 m^2 was computed and plotted for the four locations, Inner Kachemak Bay, Outer Kachemak Bay, Lower Central Cook Inlet, and Kamishak Bay, at three seasons, spring, summer, and autumn (Appendix I). The appropriate life history stages were summed within each location within each season, including the several cruises made within a season. Since many samples were averaged to produce the means, abundance could be less than 0.5 per 10 m^2. Abundance less than 0.5 per 10 m^2 was considered to be 0.4 per 10 m^2 and was plotted as the symbol, T, for trace.

Analysis of variance techniques employed the terminology of Snedecor and Cochran[1] and the computational programs of Nie et al.[2] The abundance data were transformed before the analyses by adding 1 to each observation and taking the common logarithm. The probability level P = 0.05 was used to assess statistical significance.

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[1] Snedecor, George W., and William G. Cochran. 1967. Statistical Methods. Sixth Edition. The Iowa State University Press. 593 pp.

[2] Nie, Norman H., C. Hadlai Hull, Jean G. Jenkins, Karin Steinbrenner, and Dale H. Bent. 1975. SPSS: Statistical Package for the Social Sciences. Second Edition. McGraw-Hill Book Company. 675 pp.

VI. RESULTS

The results of the 1976-1977 reconnaissance-level survey include taxonomic lists and density distribution maps of planktonic eggs and larvae of fishes and shellfishes of major economic significance in Lower Cook Inlet. The taxonomic categories of fishes, pandalid shrimp, and commercially important species of crab larvae collected in the Lower Cook Inlet region have been tabulated (Tables 8, 9, and 10). In some cases the early life history stages could not be identified to species reliably and have been reported in more inclusive categories. The more abundant and important categories were selected for further analysis (Appendices B and C).

The planktonic fish eggs are considered in four nominal size categories based on the diameter of the chorion: less than 1 mm, about 1 mm, about 2 mm, and about 3 mm (Table 11). The fish eggs in the category less than 1 mm are between 0.73 and 0.88 in diameter. The fish eggs in this category are probably *Limanda aspera*, the yellowfin sole. They were caught from May through August and were most abundant in the July samples near Kachemak Bay and Kamishak Bay.

The fish eggs in the category about 1 mm are between 0.89 and 1.28 mm in diameter. The fish eggs in this category are probably a complex of four fishes: *Isopsetta isolepis*, the butter sole; *Parophrys vetulus*, the English sole; *Platichthys stellatus*, the starry flounder; and *Psettichthys melanostictus*, the sand sole. They were caught from April through August and were most abundant in the May samples near Kachemak Bay and Kamishak Bay.

The fish eggs in the category about 2 mm are between 1.30 and 2.54 mm in diameter. The fish eggs in this category are probably *Theragra chalcogramma*, the walleye pollock, and three flatfishes, *Atheresthes stomias*, the arrowtooth flounder, *Glyptocephalus zachirus*, the rex sole, and *Lyopsetta exilis*, the slender sole. They were caught from April through August and were most abundant in the May samples at scattered locations in the Lower Cook Inlet region.

The fish eggs in the category about 3 mm are 2.56 mm and larger in diameter. The fish eggs in this category are *Hippoglossoides* of an undetermined species, probably *H. elassodon*, the flathead sole. They were caught from May through August and were most abundant in the May samples at locations near the mouth of Cook Inlet.

The larvae of *Ammodytes hexapterus*, the Pacific sand lance, were caught from April through May and again in February. These larvae were most abundant in May in Kachemak Bay. No juvenile *Ammodytes* were observed.

The larvae of *Clupea harengus pallasi*, the Pacific herring, were caught in July and August. These larvae were most abundant in July at the most northern station location. One juvenile herring was taken in October at the same location.

The larvae of the Gadidae, the codfishes, are probably *Theragra chalcogramma*, the walleye pollock, and *Gadus macrocephalus*, the Pacific cod. The gadid larvae were caught from April through July and were most abundant in May toward the mouth of Cook Inlet. One gadid juvenile was taken in August near Kachemak Bay.

The larvae identified as *Hippoglossoides* sp. are probably one species, *H. elassodon*, the flathead sole. The larvae of *Hippoglossoides* were caught from May through August and were most abundant in May and July in Kamishak Bay and toward the mouth of Cook Inlet. One juvenile *Hippoglossoides* was taken in August near Kamishak Bay.

The larvae of *Mallotus villosus*, the capelin, were caught on every cruise except late May. The capelin larvae were most abundant in July and August near Kachemak Bay and Kamishak Bay, but were taken at all sampling locations. One juvenile capelin was taken in August and another in February.

The larvae of the family Osmeridae, the smelts, probably include *Thaleichthys pacificus*, the eulachon, *Spirinchus thaleichthys*, the longfin smelt, some small *Mallotus*, and other smelt. The larvae of Osmeridae were caught on five cruises, but not in April and late May. The osmerid larvae were most abundant in July and August and were widely scattered over the Lower Cook Inlet region. One juvenile osmerid was taken in February.

The early life history stages of *Pandalopsis dispar*, the side-stripe shrimp, were taken on all cruises except October. Stages I, II, III, and IV were represented in the samples; stage V and juveniles were not represented.

The early life history stages of *Pandalus borealis*, the northern pink shrimp, were taken from April through August. Stages I, II, III, IV, V, and juveniles were represented; stages VI and VII were not represented.

The early life history stages of the shrimp *Pandalus danae* were taken in July and August. Stages II and V were represented; stages 1, III, IV, VI, and juveniles were not represented.

The early life history stages of *Pandalus goniurus*, the bumpy shrimp, were taken from April through July. Stages I, II, III, IV, and juveniles were represented; stages V, VI, and VII were not represented.

The early life history stages of *Pandalus hypsinotus*, the coon-stripe shrimp, were taken in May. Stage I was represented; stages II, III, IV, V, VI, and juveniles were not represented.

The early life history stages of the shrimp *Pandalus platyceros* were taken in February. Stage II was represented; stages I, III, IV, and juveniles were not represented.

The early life history stages of the shrimp *Pandalus stenolepis* were taken from May through August. Stages I, II, III, IV, V, and VI were represented; the juveniles were not represented.

The early life history stages of the shrimp *Pandalus montagui tridens* were taken from April through July. Stages I, II, and 111 were represented; stage IV and juveniles were not represented.

The early life history stages of non-commercial crabs of the category Anomura were taken on all cruises. The zoea and megalopa stages were represented.

The early life history stages of non-commercial crabs of the category Brachyura, the true crabs , were taken from May through February. The zoea and megalopa stages were represented.

The early life history stages of *Cancer magister*, the Dungeness crab, were taken from July through October. Stages I, II, III, V, and megalopa were represented; stage IV was not represented.

The early life history stages of *Cancer* spp. were taken on all cruises. Stages I, II, III, IV, V, and megalopa were represented.

The early life history stages of *Chionoecetes bairdi*, the tanner crab, were taken from April through October. Stages I and II and the megalopa were represented.

The early life history stages of *Paralithodes camtschatica*, the red king crab , were taken from April through July, and again in February. Stages I, II, III, and the megalopa were represented.

The most abundant shrimp was *Pandalus goniurus*, with *Pandalus borealis* and *Pandalus montagui tridens* next most abundant. The non-commercial Anomura and Brachyura were very abundant, and the small *Cancer* spp. were the most abundant crabs identified. *Paralithodes camtschatica* was the most abundant commercial crab, with *Chionoecetes bairdi* next in abundance.

The seasonal density distributions of early life history stages of selected categories are presented, as abundance per 10 m^2, on maps of the Lower Cook Inlet region (Appendix D).

The four categories of fish eggs are all present in spring and summer, but absent in fall and winter. The larvae of *Ammodytes* were present in winter and spring, but absent in summer and fall. The larvae of *Clupea harengus pallasi* were present only in summer. The larvae of the Gadidae were present in spring and summer, but absent in fall and winter. The larvae of *Hippoglossoides* sp. were present in spring and summer, but absent in fall and winter. The larvae of *Mallotus villosus* were present in all seasons, but appeared most abundant in summer. The larvae of Osmeridae were present in all seasons, but appeared most abundant in summer.

The zoea of *Pandalopsis dispar* were present in winter, spring, and summer, but absent in fall. The zoea of *Pandalus borealis* and *Pandalus montagui tridens* were present in spring and summer, but absent in fall and winter. The zoea of *Pandalus danae* were present only in summer. The zoea of *Pandalus goniurus* and *Pandalus hypsinotus* were present only in spring. The zoea of *Pandalus platyceros* were present only in winter. The zoea of *Pandalus stenolepis* were present in spring and summer.

The zoea of Anomura were present in all seasons, but appeared least abundant in the fall and winter. The zoea of the Brachyura were present in all seasons, but appeared least abundant in fall. The zoea of *Cancer magister* were present in summer and fall, but absent in winter and spring. The zoea of *Cancer* spp. were present in all seasons, but appeared most abundant in summer. The zoea of *Chionoecetes bairdi* were present in spring and summer, but absent in fall and winter. The zoea of *Paralithodes camtschatica* were present in winter and spring, but absent in summer and fall.

The annual density distributions of early life history stages of selected categories are presented, as abundance per 10 m^2, on maps of the Lower Cook Inlet region (Appendix E).

The fish eggs about 1 mm in diameter appeared the most abundant size category. Most eggs appeared in Kachemak Bay and Kamishak Bay. The larvae of *Mallotus villosus* appeared more abundant than the larvae of other fishes. The larvae were generally widely distributed.

Stages I and II of *Pandalopsis dispar*, *Pandalus borealis*, and *Pandalus hypsinotus* appeared most abundant in Kachemak Bay. The early life history stages of *Pandalus danae* were few and scattered. The early stages of *Pandalus goniurus* were abundant in Kachemak Bay and Kamishak Bay. The distributions of *Pandalus montagui tridens* and *Pandalus stenolepis* were predominately toward the mouth of Cook Inlet, below Kachemak Bay and Kamishak Bay. The early life history stages of *Pandalus platyceros* were relatively scarce.

The zoea and megalopa of the Anomura and Brachyura appeared most abundant in central Lower Cook Inlet and less abundant to the north. The early stages of *Cancer magister* were in Kachemak Bay, but the later stages were taken toward the southwest. The early life history stages of Cancer spp. were abundant in central Lower Cook Inlet, but appeared less abundant toward the north and outside the inlet, as well as in Kamishak Bay.

Stage I of *Chionoecetes bairdi* appeared most abundant in Kachemak Bay, but stage 11 was taken only toward the south. The megalopa were widely distributed, but occurred most frequently in central Lower Cook Inlet.

Stages I and II of *Paralithodes camtschatica* appeared most abundant in Kachemak Bay and Kamishak Bay. Stage III appeared most abundant in Kamishak Bay. The megalopa occurred at one station toward the north.

The results of the 1978 sampling program cover the region from Kamishak Bay across central Lower Cook Inlet into Kachemak Bay. That region included most of the early life history stages of most species in 1976-1977. The more abundant and important taxonomic categories were selected for further analysis (Appendices F, G, and H). The quantitative density distributions of early life history stages of the selected categories for three seasons in 1978 are presented, as abundance per 10 m^2, on maps of the region (Appendix I).

The temporal changes over three seasons in species composition and density at each of the four sampling sites are compared for fish eggs, fish larvae, shrimps, and crabs (Appendix J). The temporal changes over three seasons of relative abundance of life history stages of shrimps and crabs at each of the four sampling sites are also compared (Appendix K).

Analysis of variance techniques were used to examine the statistical significance of differences between the four sampling sites and the three seasons (Table 12). The analysis was attempted for each taxonomic category of fish eggs, fish larvae, shrimps, and crabs, but almost one-half of the categories considered had too few observations greater than zero to allow the analysis. In general, the more abundant categories were those for which the null hypotheses, that seasons or sites did not differ, could be rejected. However, patterns of apparent differences between sites and seasons are evident for several categories with few positive observations if one considers any positive catch to be different from zero.

Bongo net catches made at the same location during daylight and darkness within a 24-hour span have been compared for fish eggs, fish larvae, shrimps, and crabs (Figure 4). No striking day-night differences are evident.

Bongo and neuston net catches made at the same location and time have been compared for fish eggs, fish larvae, shrimps, and crabs (Figure 5). The deeper-sampling bongo net took many more crabs and fish larvae than did the surface-sampling neuston net. The neuston net seems to have taken more fish eggs per unit volume sampled than the bongo net.

VII. DISCUSSION

A. Important Species, Important Habitats, and Critical Periods

The important species in the ichthyoplankton and meroplankton of Lower Cook Inlet are primarily those harvested by commercial and sports fishermen (Table 13). Secondarily, some species are of ecosystem importance because they serve as food for the harvested species.

The harvested fishes common in this study are primarily flatfishes, codfishes, herring, and smelts. The harvested crabs are the Dungeness, king, and snow crabs. The harvested shrimps are coonstripe, dock, northern pink, side-stripe, and spot. Forage fishes include herring, sand lance, and smelts.

The habitat sampled for ichthyoplankton and meroplankton in this study was the pelagic domain of open ocean above the sea floor.

The critical periods for habitat use by ichthyoplankton and meroplankton in Lower Cook Inlet differ between areas, species, and life history stages within species (Table 14). There was no season sampled in which important species were not represented by early life history stages in the plankton.

B. Potential for Impact from OCS Oil and Gas Exploration, Development, and Production

B.I. Drilling Platforms

B.I.A. Acute Oil Spills

B.I.A.1. Kachemak Bay

B.I.A.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.A.1.b. Use by Key Species Including Life History Stages

The pelagic domain of Kachemak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kachemak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.A.1.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kachemak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in Kachemak Bay in spring, summer, fall, and winter.

B.I.A.1.d. Potential for Long Residence Times of Contaminant

Kachemak Bay has the greatest potential for long residence times of a contaminant relative to Kamishak Bay, Lower Central Zone, Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.A.1.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.A.2. Lower Central Zone

B.I.A.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.A.2.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diamter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.A.2.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.A.2.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin Island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.A.2.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.A.3. Kamishak Bav

B.I.A.3.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.A.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kamishak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diamter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, and *Pandalus stenolepis*. The crabs having early life history stages in Kamishak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.A.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kamishak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.A.3.d. Potential for Long Residence Times of Contaminant

Kamishak Bay has a potential for long residence times of contaminant second only to Kachemak Bay and greater than the Lower Central Zone, the Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.A.3.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.A.4. Kennedy Entrance

B.I.A.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.A.4.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diamter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus* borealis, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.A.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.A.4.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication) .

B.I.A.4.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.A.5. Kalgin Island Area

B.I.A.5.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.A.5.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.A.5.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.A.5.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.A.5.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B. I.B. Drill Cuttings and Drilling Muds

B.I.B.1. Lower Central Zone

B.I.B.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.B.1.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diamter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.B.1.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.B.1.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin Island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.B.1.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.B.2. Kamishak Bay

B.I.B.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.B.2.b. Use by Key Species Including Life History Stages

The pelagic domain of Kamishak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, and *Pandalus stenolepis*. The crabs having early life history stages in Kamishak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.B.2.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kamishak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.B.2.d. Potential for Long Residence Times of Contaminant

Kamishak Bay has a potential for long residence times of contaminant second only to Kachemak Bay and greater than the Lower Central Zone, the Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.B.2.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.B.3. Kennedy Entrance

B.I.B.3.a. Habitat Location and Type

The habitat in which inchthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.B.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae.

Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Branchyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.B.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.B.3.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication) .

B.I.B.3.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.B.4. Kalgin Island Area

B.I.B.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.B.4.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus* dame, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.B.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.B.4.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.B.4.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.C. Entrainment by Cooling Systems

B.I.C.1. Lower Central Zone

B.I.C.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.C.1.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mmdiameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus* borealis, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.C.1.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.C.1.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin Island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.C.1.e. Relative Sensitivities of Key Species

The relative sensitivities of key species to entrainment by cooling systems is not known to us.

B.I.C.2. Kamishak Bay

B.I.C.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.C.2.b. Use by Key Species Including Life History Stages

The pelagic domain of Kamishak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, and *Pandalus stenolepis*. The crabs having early life history stages in Kamishak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.C.2.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kamishak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.C.2.d. potential for Long Residence Times of Contaminant

Kamishak Bay has a potential for long residence times of contaminant second only to Kachemak Bay and greater than the Lower Central Zone, the Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.C.2.e. Relative Sensitivities of Key Species

The relative sensitivities of key species to entrainment by cooling systems is not known to us.

B.I.C.3. Kennedy Entrance

B.I.C.3.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.C.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.C.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.C.3.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication).

B.I.C.3.e. Relative Sensitivities of Key Species

The relative sensitivities of key species to entrainment by cooling systems is not known to us.

B.I.C.4. Kalgin Island Area

B.I.C.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.C.4.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes* *hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.C.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.C.4.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.C.4.e. Relative Sensitivities of Key Species

The relative sensitivities of key species to entrainment by cooling systems is not known to us.

B.I.D. Chronic Contamination from Formation Waters

B.I.D.1. Lower Central Zone

B.I.D.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.D.1.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus* borealis, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachyura, *Paralithodes camtschatica*, Cancer *magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.D.1.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.D.1.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin Island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.D.1.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communicant ion): "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.D.2. Kamishak Bay

B.I.D.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.D.2.b. Use by Key Species Including Life History Stages

The pelagic domain of Kamishak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, and *Pandalus stenolepis*. The crabs having early life history stages in Kamishak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.D.2.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kamishak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, and fall.

B.I.D.2.d. Potential for Long Residence Times of Contaminant

Kamishak Bay has a potential for long residence times of contaminant second only to Kachemak Bay and greater than the Lower Central Zone, the Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.D.2.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.D.3. Kennedy Entrance

B.I.D.3.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.D.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.D.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.D.3.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication).

B.I.D.3.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities of contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.I.D.4. Kalgin Island Area

B.I.D.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.I.D.4.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.I.D.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.I.D.4.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.I.D.4.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B. I.E. Interference with Fishing Activities

B.I.E.1. Lower Central Zone

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.I.E.2. Kamishak Bay

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.I.E.3. Kennedy Entrance

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.I.E.4. Kalgin Island Area

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.II. Potential Shore-Based Facilities-Tanker Terminals

B.II.A. Kachemak Bay

B.II.A.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.II.A.b. Use by Key Species Including Life History Stages

The pelagic domain of Kachemak Bay is used by relatively many early life history stages of fishes., shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kachemak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.II.A.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kachemak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in Kachemak Bay in spring, summer, fall, and winter.

B.II.A.d. Potential for Long Residence Times of Contaminant

Kachemak Bay has the greatest potential for long residence times of a contaminant relative to Kamishak Bay, Lower Central Zone, Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.II.A.e. Relative Sensitivities of Key Species

It is not clear that shore-based facilities would affect pelagic species.

B.II.B. Kennedy Entrance

B.II.B.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.II.B.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.II.B.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.II.B.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication).

B.II.B.e. Relative Sensitivities of Kev Species

It is not clear that shore-based facilities would affect pelagic species.

B.II.C. Kalgin Island Area

B.II.C.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.II.C.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.II.C.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.II.C.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.II.C.e. Relative Sensitivities of Key Species

It is not clear that shore-based facilities would affect pelagic species.

B.III. Pipelines

B.III.A. Laying Operations

B.III.A.1. Kachemak Bay

B.III.A.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.A.1.b. Use by Key Species Including Life History Stages

The pelagic domain of Kachemak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kachemak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.A.1.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kachemak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in Kachemak Bay in spring, summer, fall, and winter.

B.III.A.1.d. Potential for Long Residence Times of Contaminant

Kachemak Bay has the greatest potential for long residence times of a contaminant relative to Kamishak Bay, Lower Central Zone, Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.III.A.1.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.III.A.2. Lower Central Zone

B.III.A.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.A.2.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.A.2.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.III.A.2.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin Island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.III.A.2.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.III.A.3. Kennedy Entrance

B.III.A.3.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.A.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.A.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.III.A.3.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication).

B.III.A.3.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.III.A.4. Kalgin Island Area

B.III.A.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.A.4.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.A.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.III.A.4.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.III.A.4.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.III.B. Pipeline Breaks and Chronic Leaks

B.III.B.1. Kachemak Bay

B.III.B.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.B.1.b. Use by Key Species Including Life History Stages

The pelagic domain of Kachemak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kachemak Bay include Anomura, Branchyura, *Paralithodes camtschatica*, Cancer *magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.B.1.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kachemak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in Kachemak Bay in spring, summer, fall, and winter.

B.III.B.1.d. Potential for Long Residence Times of Contaminant

Kachemak Bay has the greatest potential for long residence times of a contaminant relative to Kamishak Bay, Lower Central Zone, Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.III.B.1.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.III.B.2. Lower Central Zone

B.III.B.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.B.2.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.B.2.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.III.B.2.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.III.B.2.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.III.B.3. Kennedy Entrance

B.III.B.3.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.B.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Branchyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.B.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.III.B.3.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication).

B.III.B.3.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.III.B.4. Kalgin Island Area

B.III.B.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.III.B.4.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.III.B.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.III.B.4.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.III.B.4.e. Relative Sensitivities of Key Species

It does not seem likely that pelagic organisms would be greatly affected by pipeline laying operations.

B.IV. Tanker Routes

B.IV.A. Tanker Spills Along Routes

B.IV.A.1. Kachemak Bay

B.IV.A.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.IV.A.1.b. Use by Key Species Including Life History Stages

The pelagic domain of Kachemak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kachemak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.IV.A.1.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kachemak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in Kachemak Bay in spring, summer, fall, and winter.

B.IV.A.1.d. Potential for Long Residence Times of Contaminant

Kachemak Bay has the greatest potential for long residence times of a contaminant relative to Kamishak Bay, Lower Central Zone, Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.IV.A.1.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.IV.A.2. Lower Central Zone

B.IV.A.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.IV.A.2.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, Cancer spp., and *Chionoecetes bairdi*.

B.IV.A.2.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.IV.A.2.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin Island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.IV.A.2.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication): "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.IV.A.3. Kamishak Bay

B.IV.A.3.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.IV.A.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kamishak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, and *Pandalus stenolepis*. The crabs having early life history stages in Kamishak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.IV.A.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kamishak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, and fall.

B.IV.A.3.d. Potential for Long Residence Times of Contaminant

Kamishak Bay has a potential for long residence times of contaminant second only to Kachemak Bay and greater than the Lower Central Zone, the Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.IV.A.3.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.IV.A.4. Kennedy Entrance

B.IV.A.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.IV.A.4.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae.

Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.IV.A.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.IV.A.4.a. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication).

B.IV.A.4.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.IV.A.5. Kalgin Island Area

B.IV.A.5.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.IV.A.5.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.IV.A.5.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.IV.A.5.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.IV.A.5.e. Relative Sensitivities of Key Species

Some general conclusions from bioassay data have been drawn about relative sensitivities to contaminants (Lois Killewich, personal communication) : "Pelagic organisms are more sensitive than benthos, and intertidal species are the least sensitive. Among life stages, immature ones are often more sensitive than adults, particularly in the case of crustaceans." Therefore, these immature stages of pelagic organisms must be considered to be relatively highly sensitive.

B.IV.B. Interference with Fishing Activities

B.IV.B.1. Kachemak Bay

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.IV.B.2. Lower Central Zone

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.IV.B.3. Kenned y Entrance

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.IV.B.4. Kalgin Island Area

The early life history stages of fishes, shrimps, and crabs are not subject to fishing in Lower Cook Inlet.

B.V. Physical Disturbance

B.V.1. Kachemak Bay

B.V.1.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.V.1.b. Use by Key Species Including Life History Stages

The pelagic domain of Kachemak Bay is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, Pan.dabs *stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kachemak Bay include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.V.1.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kachemak Bay in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in Kachemak Bay in spring, summer, fall, and winter.

B.V.1.d. Potential for Long Residence Times of Contaminant

Kachemak Bay has the greatest potential for long residence times of a contaminant relative to Kamishak Bay, Lower Central Zone, Kalgin Island Area, and Kennedy Entrance (J. D. Schumacher, personal communication).

B.V.1.e. Relative Sensitivities of Key Species

Pelagic organisms should not be greatly affected by the physical disturbance caused by aircraft and boat traffic.

B.V.2. Lower Central Zone

B.V.2.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.V.2.b. Use by Key Species Including Life History Stages

The pelagic domain of the Lower Central Zone is used by relatively many early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Limanda aspera*, *Mallotus villosus*, and Osmeridae. The early life histories of pandalid shrimp include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, *Pandalus goniurus*, *Pandalus hypsinotus*, *Pandalus platyceros*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in the Lower Central Zone include Anomura, Brachura, *Paralithodes camtschatica*, *Cancer magister*, *Cancer* spp., and *Chionoecetes bairdi*.

B.V.2.c. Seasonality-Critical Periods of Use

In the Lower Central Zone of Cook Inlet fish eggs were observed in spring, summer, and fall. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring, summer, and winter. Early life history stages of crabs were observed in spring, summer, and fall.

B.V.2.d. Potential for Long Residence Times of Contaminant

The Lower Central Zone has a potential for long residence times of a contaminant less than Kachemak Bay or Kamishak Bay and greater than the Kalgin Island Area and Kennedy Entrance (J. D. Schumacher, personal communication).

B.V.2.e. Relative Sensitivities of Key Species

Pelagic organisms should not be greatly affected by the physical disturbance caused by aircraft and boat traffic.

B.V.3. Kennedy Entrance

B.V.3.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.V.3.b. Use by Key Species Including Life History Stages

The pelagic domain of Kennedy Entrance is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1, 2, and 3 mm diameter. The fish larvae include *Ammodytes hexapterus*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus goniurus*, *Pandalus stenolepis*, and *Pandalus montagui tridens*. The crabs having early life history stages in Kennedy Entrance include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.V.3.c. Seasonality-Critical Periods of Use

Fish eggs were observed in Kennedy Entrance in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.V.3.d. Potential for Long Residence Times of Contaminant

Kennedy Entrance has the least potential for long residence times of contaminant, less than Kachemak Bay, Kamishak Bay, the Lower Central Zone, and the Kalgin Island Area (J. D. Schumacher, personal communication).

B.V.3.e. Relative Sensitivities of Key Species

Pelagic organisms should not be greatly affected by the physical disturbance caused by aircraft and boat traffic.

B.V.4. Kalgin Island Area

B.V.4.a. Habitat Location and Type

The habitat in which ichthyoplankton and meroplankton occur is the pelagic domain of open ocean above the sea floor.

B.V.4.b. Use by Key Species Including Life History Stages

The pelagic domain of the Kalgin Island Area is used by a considerable number of early life history stages of fishes, shrimps, and crabs. The fish eggs include those less than 1 mm diameter and those about 1 and 2 mm diameter. The fish larvae include *Ammodytes hexapterus*, *Clupea harengus pallasi*, Gadidae, *Hippoglossoides elassodon*, *Mallotus villosus*, and Osmeridae. Early life history stages of pandalid shrimps include *Pandalopsis dispar*, *Pandalus borealis*, *Pandalus danae*, and *Pandalus goniurus*. The crabs having early life history stages in the Kalgin Island Area "include Anomura, Brachyura, *Paralithodes camtschatica*, *Cancer* spp., and *Chionoecetes bairdi*.

B.V.4.c. Seasonality-Critical Periods of Use

Fish eggs were observed in the Kalgin Island Area in spring and summer. Fish larvae were observed in spring, summer, fall, and winter. Early life history stages of shrimps were observed in spring and summer. Early life history stages of crabs were observed in spring, summer, fall, and winter.

B.V.4.d. Potential for Long Residence Times of Contaminant

The Kalgin Island Area has a potential for long residence times of contaminant less than Kachemak Bay, Kamishak Bay, and the Lower Central Zone, but greater than Kennedy Entrance (J. D. Schumacher, personal communication).

B.V.4.e. Relative Sensitivities of Key Species

Pelagic organisms should not be greatly affected by the physical disturbance caused by aircraft and boat traffic.

VIII. CONCLUSIONS

The objectives of this study have been realized. An extensive sampling and analysis program has provided a large body of new observations on quantitative seasonal changes of eggs and larvae of fishes and shellfishes of major economic significance in Lower Cook Inlet.

Early life history stages of important components of the food webs of Lower Cook Inlet, Kachemak, and Kamishak Bays, especially fish eggs, fish larvae, shrimps, and crabs, have been identified, quantified, and tabulated. The temporal and spatial dynamics and distributions of ichthyoplankters and planktonic stages of shrimps and crabs have been tabulated, depicted, and discussed. The timing and use of areas within Lower Cook Inlet--Kachemak Bay, Lower Central Zone, Kamishak Bay, Kennedy Entrance, and Kalgin Island Area--by early life history stages of fishes, shrimps, and crabs have been tabulated, depicted, and evaluated.

The substantial results of this study can be used in the present form to answer many questions related to management of the Lower Cook Inlet ecosystem. These results can also be analyzed in other ways to support informed management decisions about questions yet unasked about resource use conflicts.

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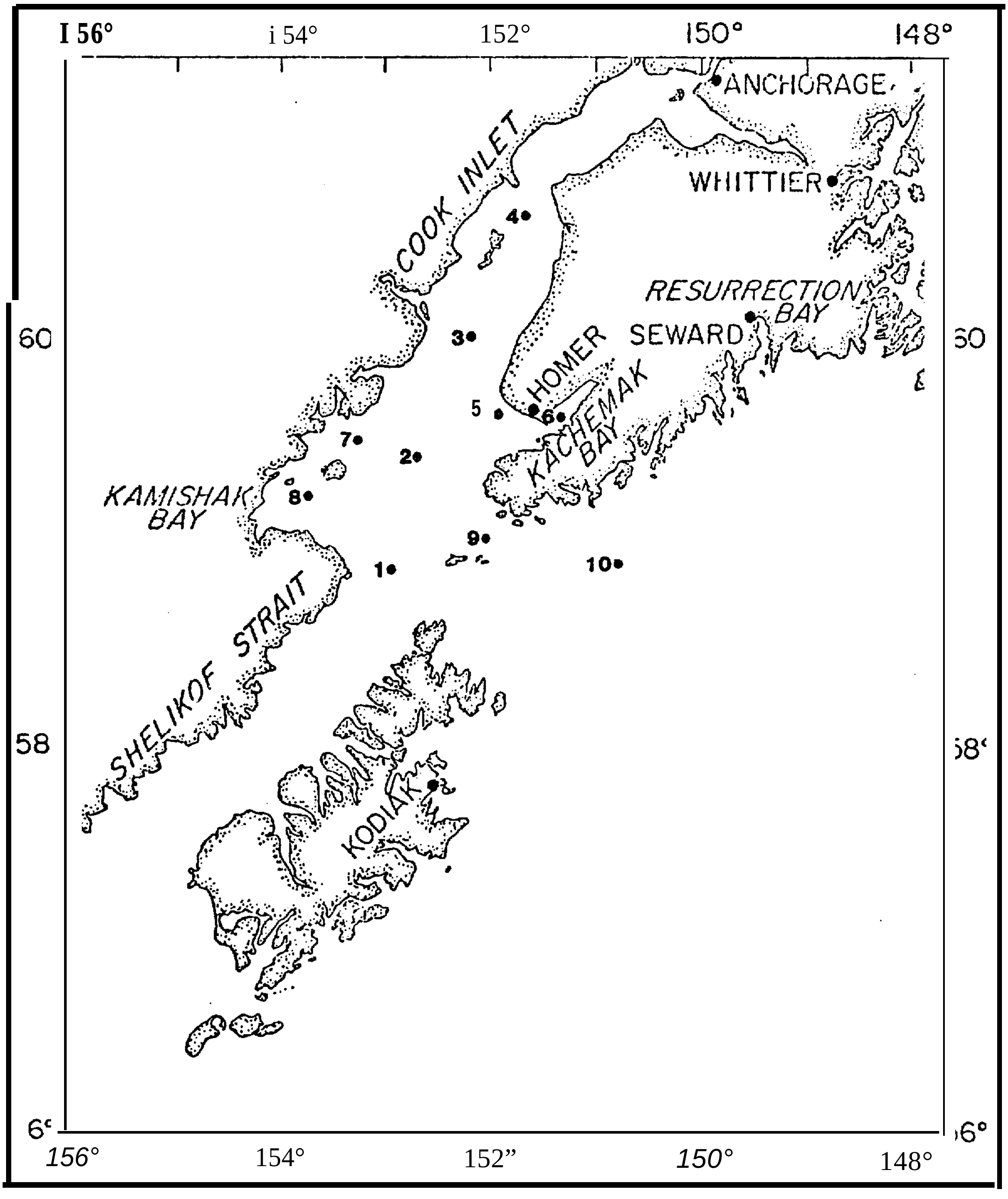

Figure 1. Station locations in the Lower Cook Inlet area, 1976-1977.

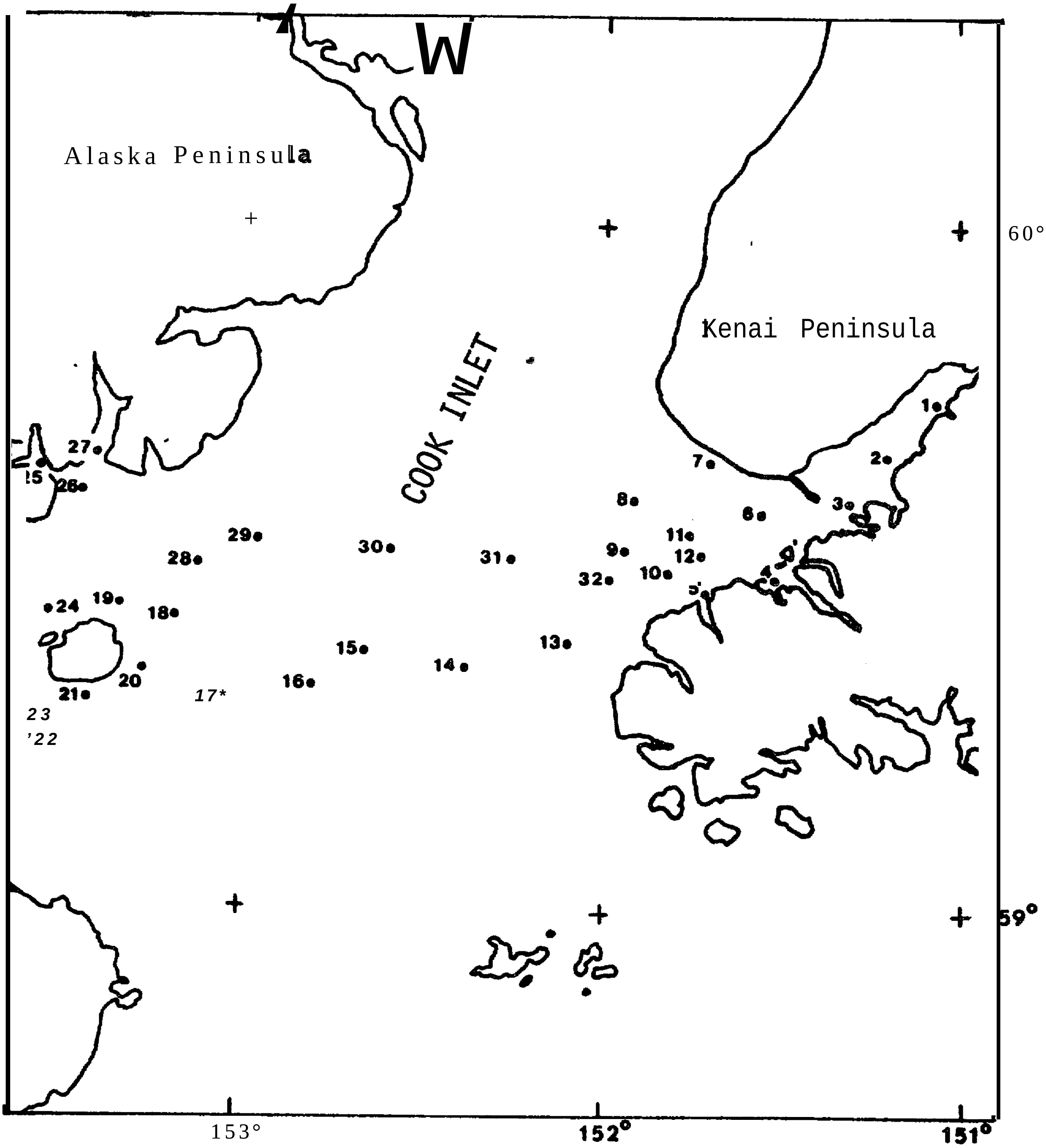

Figure 2a. Station locations in Lower Cook Inlet, 1978.

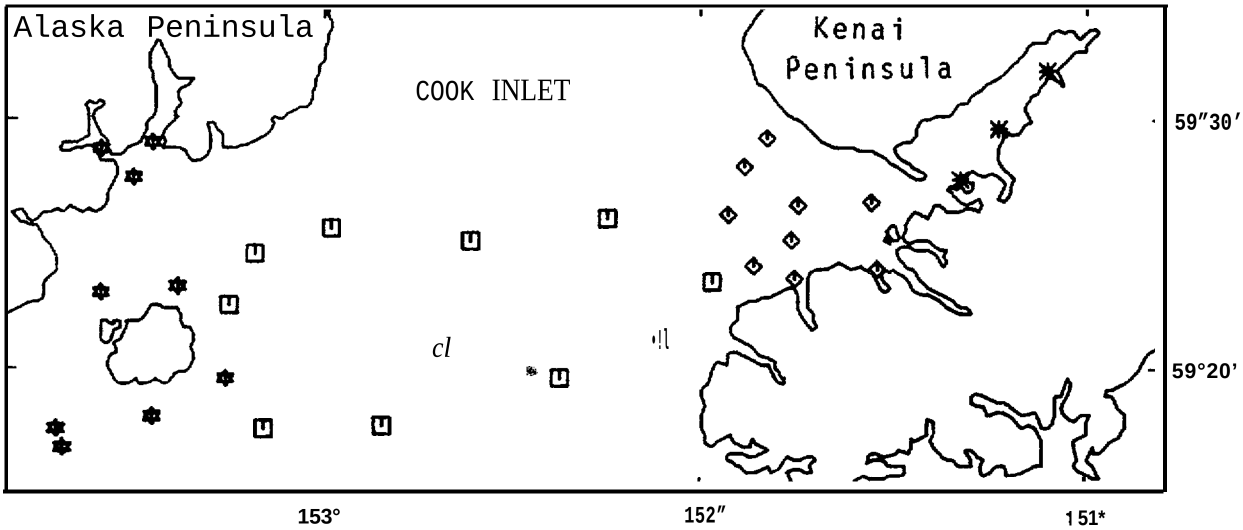

Figure 2b. Sampling areas in Lower Cook Inlet, 1978.

= INNER KACHEMAK BAY
= OUTER KACHEMAK BAY
= LOWER CENTRAL ZONE .
= KAMISHAK BAY

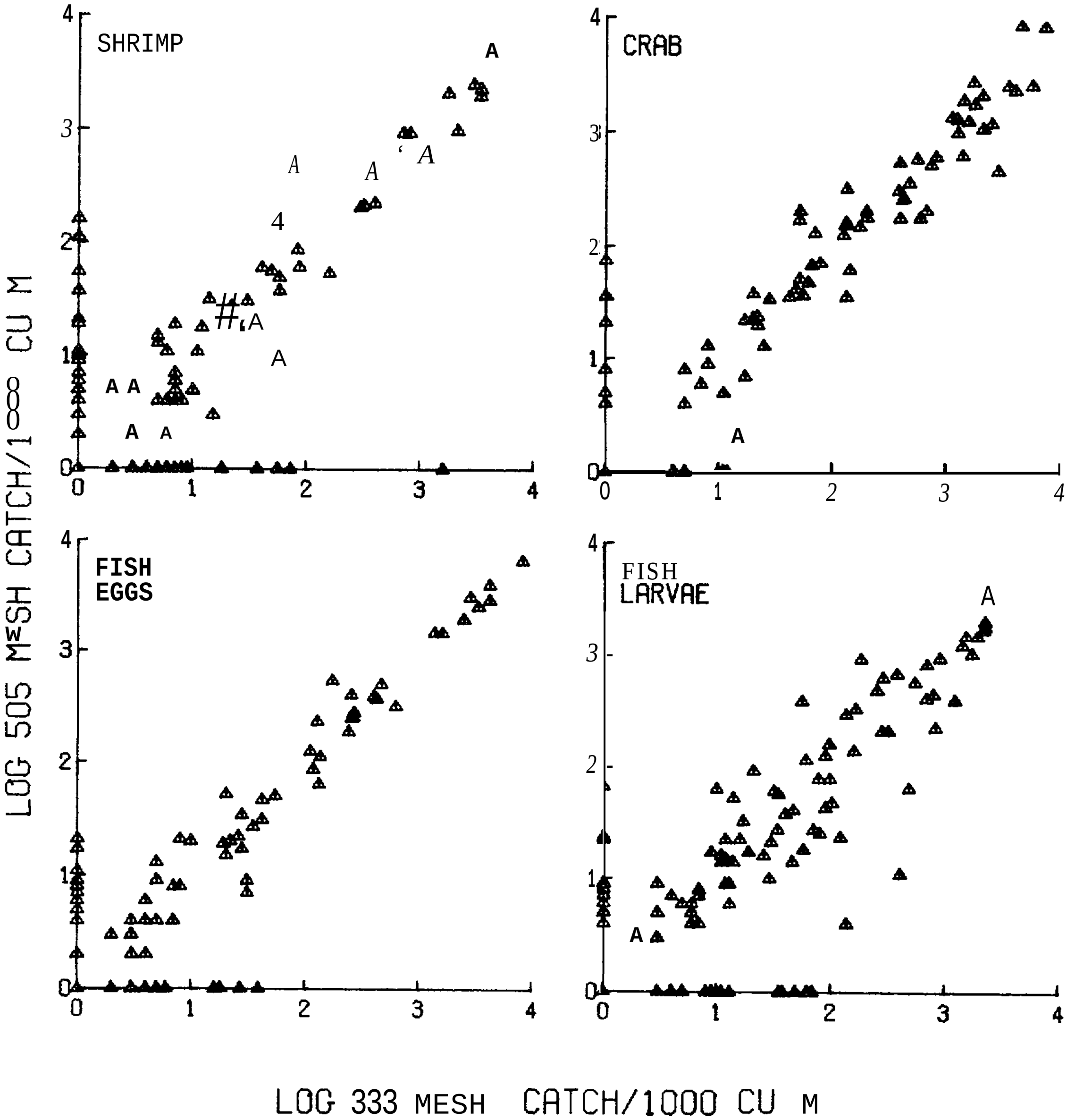

Figure 3. Comparison of concentrations between 333 and 505 µm mesh nets.

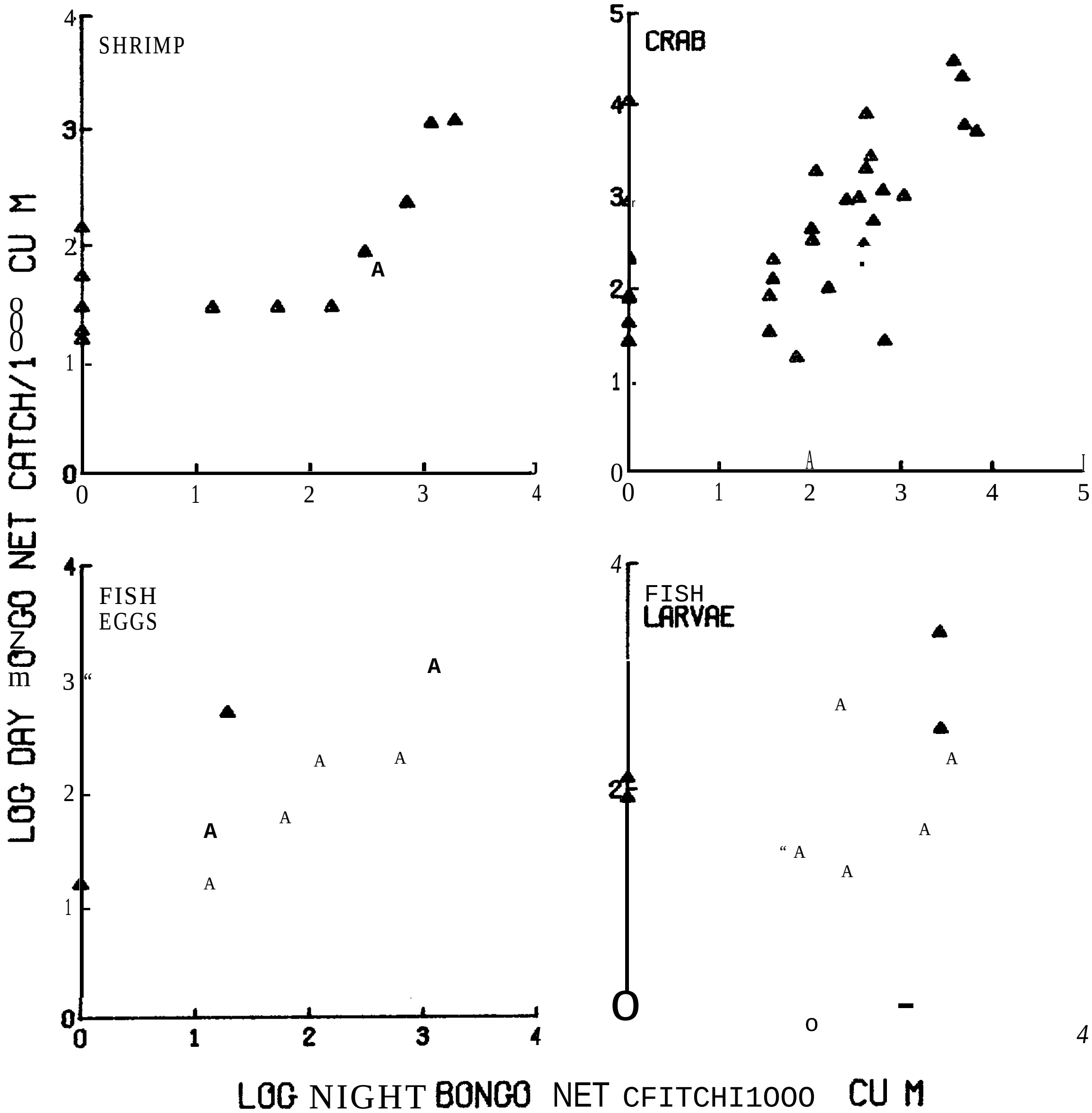

Figure 4. Bongo net catches during daylight and darkness at the same location within a 24-hour period.

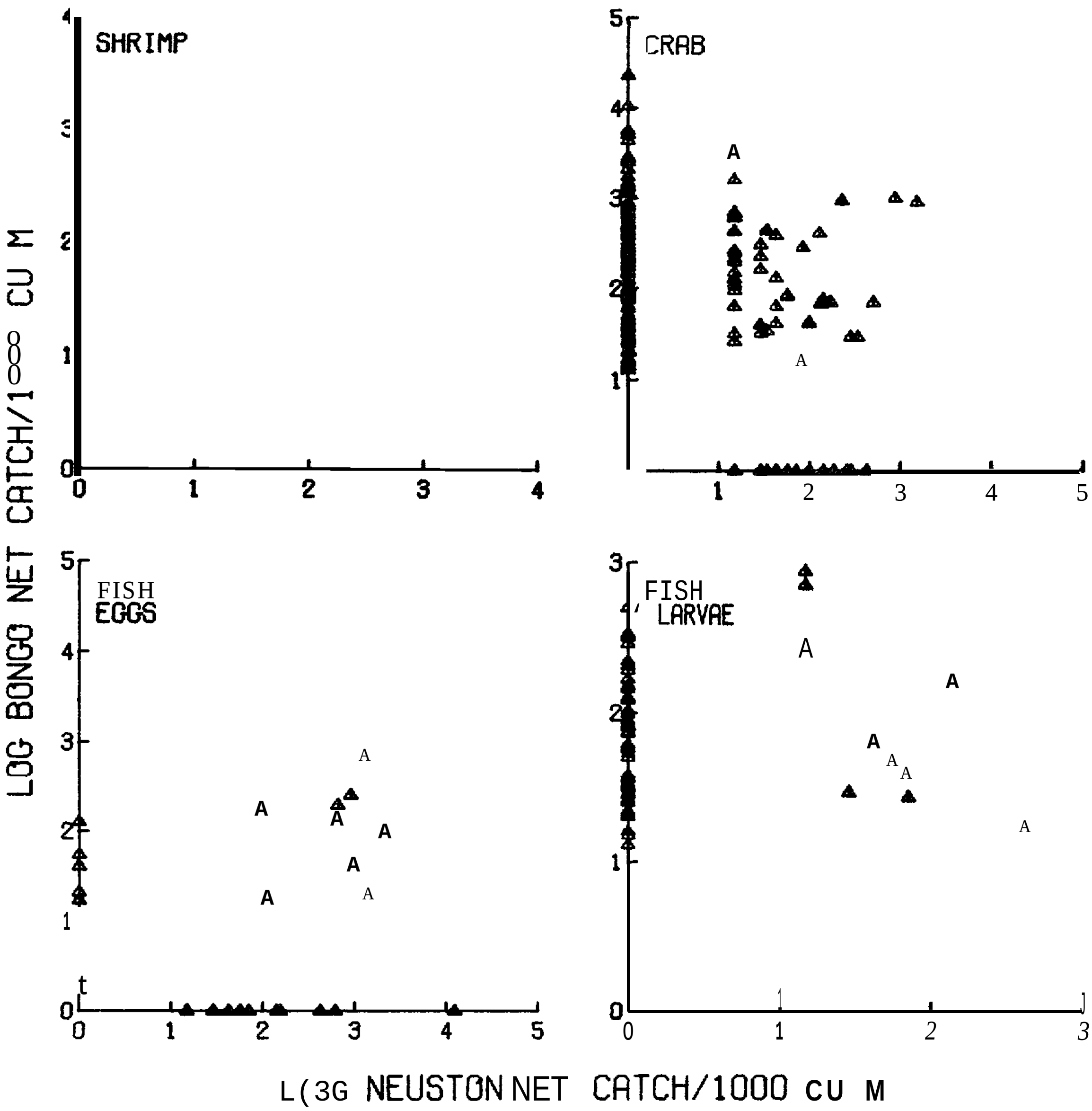

Figure 5. Bongo and neuston net catches at the same location and time.

Table 1. Annotated literature review; fish eggs and larvae

References	Area of Study	Nature of Study	Specific Features of Interest
Ahlstrom, 1972	California	Distribution of *Bathylagus stilbius*, *Stenobrachius leucopsarus*, and four non-Alaskan species in the California Current Region	Illustrations of planktonic larvae.
Ahlstrom and Moser, 1975	California	Distribution of flatfishes in the California Current Region	Brief descriptions of planktonic eggs and larvae, figures.
Bell and St. Pierre, 1970	North Pacific	Eggs and larvae of *Hippoglossus hippoglossus stenolepis*	Descriptions of eggs and larvae, figures, life history, and commercial fisheries.
Blackburn, 1973	Puget Sound, Washington	Ichthyoplankton survey of Skagit Bay	Species list, key to elongate fishes (Ammodytidae, Bathymasteridae, Clupeidae, Engraulidae, Osmeridae, Pholidae, and Stichaeidae), descriptions of larvae for elongate and non-elongate fishes (Cottidae, Hexagrammidae, and Pleuronectidae), figures.
Budd, 1940	Monterey Bay, California	Development of eggs and early larvae of *Parophrys vetulus*, *Pleuronichthys decurrens*, *Pleuronichthys coenosus*, and three non-Alaskan species	Descriptions of eggs and larvae, figures. Eggs and larvae from the plankton.

Table 1. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Damkaer, 1977	Prince William Sound, Gulf of Alaska, Lower Cook Inlet	Abundance and distribution of zooplankton	Samples taken jointly with RU 424 and collaborates with total zooplankton abundance and distribution.
Delacy, Hitz, and Dryfoos, 1964	Puget Sound, Washington coast	Reproduction of several *Sebastes* species	Descriptions of ovarian eggs, larval descriptions, figures of nine species, and life history. Eggs and larvae from the plankton.
Efremenko and Lisovenko, 1972	Gulf of Alaska	Intraovarian and pelagic larvae of some Alaskan *Sebastes* species	Descriptions of intraovarian and pelagic larvae, figures. Larvae from the plankton.
English, 1976	Alaskan waters	Pelagic fish eggs and larvae, shrimp and crab larvae	Keys in table form, figures.
Fraser and Hansen, eds., 1967	North Atlantic	Larvae of Ammodytidae	Keys and descriptions of larvae, figures.
Gorbunova, 1954	NW Pacific Ocean and Bering Sea	Reproduction and development of *Theragra chalcogramma*	Life history, descriptions of eggs, larvae, and juveniles; brief sections describing larvae and juveniles of *Gadus morhua macrocephalus*, *Eleginus gracilis*, and *Boreogadus saida*; figures.

Table 1. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Gorbunova, 1962	NW Pacific Ocean (?)	Spawning and development of Hexagrammidae	Text in Russian, English abstract; descriptions of embryonic and larval development for *Pleurogrammus monopterygius*, *Hexagrammos octogrammus*, *Hexagrammos lagocephalus*; descriptions of larvae for *Hexagrammos stelleri*, *Hexagrammos decagrammus*, and *Hexagrammos superciliosus*; larval key and figures.
Hickman, 1959	Puget Sound, Washington	Larval development of *Psettichthys melanostictus*	Descriptions of larvae and early juveniles; figures. Larvae from the plankton.
Howe and Richardson, 1978	NE Pacific Ocean	Characteristics of juvenile and adult Cottidae fishes.	Compilation of taxonomic characteristics of 40 genera of Cottidae including meristic variation in fin spines, fin rays and vertebrae both from samples collected and the literature. Artificial keys to cottid genera and species.
Kobayashi, 1961	Okhotsk Sea, North Pacific Ocean	Larvae and young of *Ptilichthys goodei*	Text in Japanese, English summaries of descriptions of larvae and young; figures.
Malins, 1977	Arctic and Subarctic	Compilation of studies on the effects of petroleum on marine organisms	Various effects on organisms including toxic, pathological and sublethal, and the metabolism of petroleum hydrocarbons by bacteria, algae, invertebrates, fish, marine birds and mammals as well as ecosystems.

Table 1. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
McAllister, 1963	World-wide	Systematic of Osmeridae fishes	Synonymies, descriptions and keys to subfamilies, genera, species and subspecies, with illustrations and distribution maps for each species.
Miller, 1969	San Juan Is., Washington	Life history of *Hippoglossoides elassodon*	Life history, descriptions of egg and larval development, and photographs. Eggs artificially spawned and from the plankton, raised in the lab.
Morris, 1956	Monterey Bay, California	Early larvae of four *Sebastes* species: *S. goodei*, *S. jordani*, *S. paucispinus*, and *S. saxicola*	Descriptions of larvae and figures. Larvae raised in the lab.
Moser, 1967	Southern California	Reproduction and development of *Sebastes paucispinis* and comparison with other rockfishes	Descriptions of ovarian eggs and intraovarian and planktonic larvae, figures of larvae and early juveniles. Larvae from the plankton.
Moser, 1974	Southern California	Development and distribution of larvae and juveniles of *Sebastolobus*	Descriptions of larvae and juveniles, figures. Larvae from the plankton.

Table 1. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Moser and Ahlstrom, 1974	World-wide	Systematic investigations of larval stages of Myctophidae	Descriptions of larvae, figures. Larvae from the plankton.
O'Connell, 1953	California	Life history of *Scorpaenichthys marmoratus*	Life history, descriptions of unfertilized egg, larvae, and young; figures. Artificially spawned eggs, larvae from the plankton,
Orcutt, 1950	Monterey Bay, California	Life history of *Platichthys stellatus*	Descriptions of eggs, larvae, and young; figures, life history and commercial fishery. Eggs artificially spawned and reared in the lab.
Phillips, 1977	Strait of Georgia	Taxonomic guide	Summary of taxonomic characteristics of five species of *Oncorhynchus* with illustrations to facilitate rapid identification.
Quast and Hall, 1972	Alaska	List of fishes of Alaska	Species lists, distributions, and references,
Richardson and DeHart, 1975	Oregon coast	Larvae, young, and adults of *Ptilichthys goodei*	Descriptions of larvae, young, and adults; figure of larva. Larvae from the plankton.
Richardson and Washington, 1978	NE Pacific Ocean	Characteristics of larval Cottidae	Compilation of taxonomic characteristics and illustrations of 14 genera of Cottidae taken in plankton collections off Oregon and 11 genera taken from the literature.

Table 1. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Saville, 1964	North Atlantic	Eggs and larvae of Clupeidae	Keys to eggs and larvae, descriptions and figures of larvae.
Templeman, 1948	Newfoundland	Life history of *Mallotus villosus*	Life history, descriptions of eggs and larvae; figures of larvae. Larvae from the plankton.
Trautman, 1973	Auke Bay, Alaska	Taxonomic guide	Methods of preserving specimens and description of characters used in identifying five species of presmolt Pacific salmon. Includes keys and illustrations.

Table 2. Annotated literature review; crabs

References	Area of Study	Nature of Study	Specific Features of Interest
Hart, 1935	Nanaimo, British Columbia	Larvae of *Lophopanopeus bellus bellus*, *Hemigrapsis nudis* and *H. oregonensis*	Descriptions of larval stages, and figures of crabs with larvae similar to commercially important species.
Hart, 1960	Nanaimo, British Columbia	Larvae of *Oregonia gracilis* and *Hyas lyratus*	Descriptions of larval stages, and figures of crabs with larvae similar to commercially important species.
Hart, 1971	British Columbia	Key to planktonic larvae of families of decapod Crustacea	Figures.
Haynes, 1973	Bristol Bay, Alaska	Larvae of *Chionoecetes bairdi* and C. *opilio*	Descriptions of prezoea and first stage; figures. Larvae raised at sea and preserved.
Haynes and Wing, 1977	Kachemak Bay, Alaska	Distribution of king crab and pandalid shrimp larvae	Geographical, seasonal and diel vertical migration of larvae and comparison of water current patterns with distribution of larvae.
Hoffman, 1968	Auke Bay, Alaska	Larvae of *Paralithodes platypus*	Descriptions of larval stages and figures. Larvae raised in the lab.
Karinen and Rice, 1974	Auke Bay, Alaska	Effects of oil on tanner crabs	Most significant effect of oil on crabs was the autotomy of limbs, or death in high concentrations.

Table 2. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Kurata, 1956	Hokkaido, Japan	Larvae of *Paralithodes brevipes*	Text in Japanese, brief English summaries of larval stages, figures. Larvae similar to commercially important species.
Kurata, 1963a	Hokkaido, Japan	Larvae of *Erimacrus isenbeckii* and *Telmessus cheiragonus*	Text in Japanese, brief English summaries of larval stages, figures. Larvae similar to commercially important species.
Kurata, 1963b	Hokkaido, Japan	Larvae of *Chionoecetes opilio elongatus* and *Hyas coarctatus alutaceus*	Text in Japanese, brief English summaries of larval stages, figures. Larvae similar to commercially important species.
Kurata, 1964	Hokkaido, Japan	Larvae of *Paralithodes camtschatica*, *P. brevipes* and *P. platypus*	Text in Japanese, brief English summaries of larval stages; figures.
Lough, 1975	Newport Bay, Oregon	Keys to larvae of *Cancer magister*, *C. productus* and *C. oregonensis*	Includes keys to families, and species of crabs with larvae similar to commercially important species.
Marukawa, 1933	Japanese waters	Descriptions of adult *Paralithodes camtschatica* biology and fishery	Illustrations of larval stages but no descriptions in English.
Motoh, 1973	Sea of Japan	Larvae of *Chionoecetes opilio*	Descriptions of larval stages; figures. Larvae raised in the lab.

Table 2. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Poole, 1966	Eureka, California	Larvae of *Cancer magister*	Descriptions of larval stages; figures. Larvae raised in the lab.
Sato and Tanaka, 1949	Hokkaido, Japan	Larvae of *Paralithodes camtschatica*	Descriptions of larval stages; figures. Larvae raised in the lab.
Sundberg and Clausen, 1977	Kachemak Bay and Lower Cook Inlet, Alaska	Distribution of post-larval *Paralithodes camtschatica*	Abundance and distribution of post-larval king crabs sampled with bottom skimmer trawl and diver-operated suction dredge and comparison between abundance and substrate.
Trask, 1970	Humboldt Bay, California	Larvae of *Cancer productus*	Descriptions of larval stages, figures and comparison with *Cancer magister* larvae. Larvae raised in the lab.

Table 3. Annotated literature review; shrimps

References	Area of Study	Nature of Study	Specific Features of Interest
Alaska Dept. of Fish and Game, 1975	Kachemak Bay, Alaska	Circulation, ecology, commercial fishing, potential impact of oil spill, conservation of renewable energy resources	*Pandalus borealis*, *P. goniurus*, *P. hypsinotus* and *Pandalopsis dispar* were the four species of shrimp caught commercially with the first two comprising 93% of trawl catches. *Pandalus hypsinotus* comprises 90% of pot catches. King crab, Tanner crab and Dungeness crab caught commercially.
Barr, 1970	Lower Cook Inlet Kenai Peninsula and Kodiak Is.	Commercial species of Alaskan shrimp	Key to species, life history, figures, domestic and foreign fisheries.
Berkeley, 1930	Nanaimo, British Columbia	Larvae of *Pandalopsis dispar*, *Pandalus borealis*, *P. danae*, *P. hypsinotus*, *P. platyceros*	Descriptions of larval stages, and adults, figures, key to species. First stage larva raised in the lab, later stages from plankton.
Greenwood, 1959	Lower Cook Inlet, Shelikof Strait, and Kodiak Is., Alaska	Exploratory research	*Pandalus borealis*, *Pandalopsis dispar* and *Pandalus hypsinotus* were 3 most abundant commercially important shrimp.
Haynes, 1976	Kasitsna Bay, Alaska	Larvae of *Pandalus hypsinotus*	Descriptions of larval stages, figures and comparison of zoeal stages by other authors. Larvae raised in the lab.

Table 3. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Haynes, 1978	Kachemak Bay, Alaska	Larvae of *Pandalus goniurus*	Descriptions of larval stages, figures and comparison of zoeal stages by other authors. Larvae raised in situ in Kachemak Bay,
Haynes and Wing, 1977	Kachemak Bay Alaska	Distribution of king crab and pandalid shrimp larvae	Geographical, seasonal and diel vertical migration of larvae and comparison of water current patterns with distribution of larvae.
Ivanov, 1965	Russian waters	Larvae of *Pandalus tridens*, *Eualus macilentus*, *E. barbatus*, *Spirontocaris spina*, *Lebbeus groenlandicus*	First stage illustrated, text in Russian.
Ivanov, 1971	Russian waters	Larvae of *Pandalus goniurus*	First stage illustrated, text in Russian.
Kurata, 1964	Hokkaido, Japan	Larvae of *Pandalus borealis*, *P. hypsinotus* and *Pandalopsis coccinata*	Text in Japanese, brief English summaries of larval stages, figures.
Lee, 1969	Seattle, Washington	Larvae of *Pandalus jordani*	Descriptions of larval stages, figures and comparisons of zoeal stages by other authors. Larvae raised in the lab.
Modin and Cox, 1967	Crescent City, California	Larvae of *Pandalus jordani*	Descriptions of larval stages and figures. Larvae raised in the lab.

Table 3. (continued)

References	Area of Study	Nature of Study	Specific Features of Interest
Needler, 1938	Nanaimo, British Columbia	Larvae of *Pandalus stenolepis*	Descriptions of larval stages and figures. 1st and 2nd stages raised in the lab, 2nd to 7th from the plankton.
Price and Chew, 1972	Dabob Bay, Washington	Larvae of *Pandalus platyceros*	Descriptions of larval stages and figures. Larvae-raised in the lab.
Rathbun, 1904	Arctic Alaska to Southern California	Adult decapod crustaceans	Descriptions, figures, keys and distributions.
Ronholt, 1963	Southern Alaskan waters	Exploratory research	*Pandalus borealis*, *Pandalopsis dispar*, and *Pandalus hypsinotus* were the 3 most abundant commercially important shrimp in the Lower Cook Inlet area.

Table 4. Station locations in 1976-1977.

Station	Latitude (N)	Longitude (W)	Chart Depth (m)	Location
1	58° 53.0'	152° 48.0'	174	Lower Cook Inlet
2	59° 22.0'	152° 40.0'	62	Lower Cook Inlet
3	60° 00.0'	152° 10.0'	58	Lower Cook Inlet
4	60° 40.0'	151” 40.0'	36	Cook Inlet
5	59° 35.0'	151° 49.0'	36	Outer Kachemak Bay
6	59° 36.0'	151° 18.0'	77	Inner Kachemak Bay
7	59° 30.0'	153° 10.0'	35	Lower Cook Inlet
8	59° 14.0'	153° 40.0'	29	Kamishak Bay
9	59° 02.0'	151° 58.0'	196	Kennedy Entrance
10	58° 52.0'	150° 51.0'	210	Gulf of Alaska

Table 5. Station locations in 1978.

Station	Latitude (N)	Longitude (W)	Depth (m)	
1	59° 44.0′	151° 04.0′	36	Inner Kachemak Bay
2	59° 40.0′	151° 12.0′	64	Inner Kachemak Bay
3	59° 36.0′	151° 18.0′	79	Inner Kachemak Bay
4	59° 28.5′	151° 32.0′	18	Outer Kachemak Bay
5	59° 28.0′	151° 44.5′	18	Outer Kachemak Bay
6	59° 34.0′	151° 32.5′	73	Outer Kachemak Bay
7	59° 39.0′	151° 48.0′	29	Outer Kachemak Bay
8	59° 37.0′	151° 52.0′	26	Outer Kachemak Bay
9	59° 33.0′	151° 55.0′	35	Outer Kachemak Bay
10	59° 29.0′	151° 51.0′	60	Outer Kachemak Bay
11	59° 34.0′	151° 44.0′	73	Outer Kachemak Bay
12	59° 31.0′	151° 45.0′	84	Outer Kachemak Bay
13	59° 23.0′	152° 06.0′	53	Lower Central Cook Inlet
14	59° 20.0′	152° 22.0′	79	Lower Central Cook Inlet
15	59° 22.5′	152° 40.0′	59	Lower Central Cook Inlet
16	59° 16.3′	152° 49.5′	88	Lower Central Cook Inlet
17	59° 15.9′	153° 08.5′	53	Lower Central Cook Inlet
18	59° 26.0′	153° 14.0′	37	Lower Central Cook Inlet
19	59″ 27.5′	153° 22.0′	27	Kamishak Bay
20	59° 20.0′	153° 14.0′	48	Kamishak Bay
21	59° 17.0′	153° 26.0′	26	Kamishak Bay
22	59° 14.0′	153° 40.0′	29	Kamishak Bay
23	59° 15.9′	153° 41.0′	27	Kamishak Bay
24	59° 27.0′	153° 34.0′	20	Kamishak Bay
25	59° 38.0′	153° 35.0′	5	Kamishak Bay
26	59° 36.0′	153° 29.0′	5	Kamishak Bay
27	59° 39.0′	153° 26.0′	5	Kamishak Bay
28	59° 30.0′	153° 10.0′	35	Lower Central Cook Inlet
29	59° 32.0′	152° 58.0′	41	Lower Central Cook Inlet
30	59° 31.0′	152° 36.0′	60	Lower Central Cook Inlet
31	59° 33.0′	152° 14.0′	48	Lower Central Cook Inlet
32	59° 28.0′	151° 58.0′	66	Lower Central Cook Inlet

Table 6. Samples taken at ten locations on seven cruises in four seasons in Lower Cook Inlet, April 1976 through February 1977.

	Spring			Summer		Fall	Winter
Station	6-13 Apr	6-9 May	22-30 May	8-15 Jul	24-31 Aug	17-29 Ott	21-26 Feb
1	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x
3	x	X	X	X	X	x	X
4	x	x	x	x	x	x	x
5	X	x	X	x	x	x	x
6	x	x	x	x	x	x	x
7	X	X	X	x	X	X	X
8		x	x	x	x	x	x
9	X	X		X	X	X	X
10	x		X	X	X		X

Table 7. Samples taken in 1978 at 32 station locations in four areas of Lower Cook Inlet on seven cruises in three seasons with bongo and neuston nets: X indicates bongo net and O indicates neuston net.

		Spring		Summer		Autumn		
Area	Station	19 May-9 Jun	26 Jun-6 Jul	11 Jul-16 Jul	6 Aug-14 Aug	22 Aug-29 Aug	31 Aug-2 Sep	20 Sep-27 Sep
Inner Kachemak	1	X	X		X	XO	XO	XO
	2	X	X		X	XO	XO	XO
	3	X	X		X	XO	XO	XO
Outer Kachemak	4		X	X	X	XO	XO	XO
	5					XO	XO	XO
	6	X	X	X	X	XO	XO	XO
	7	X	X	X	X		XO	XO
	8	X	X	X	X	XO	XO	XO
	9	X	X	X	X	XO	XO	XO
	10	X	X	X	X	XO		XO
	11	X	X	X	X	XO	XO	XO
	12	X	X	X	X		XO	XO
Lower Central	13	X	X	X	X	XO		
	14	X	X	X	X	XO		
	15	X	X	X	X	XO		
	16	X	X	X	X	XO		
	17		X	X	X			
	18	X		X	X	XO		
	28	X	X	X	XO	XO		
	29	X	X	X	XO	XO		
	30	X	X	X	XO	XO		
	31	X	X	X	XO	XO		
	32	X	X	X	XO	XO		
Kamishak	19	X	X	X				XO
	20	X	X	X				XO
	21	X	X	X				XO
	22	X	X	X				XO
	23	X	X	X				XO
	24	X	X	X				XO
	25		X	X				
	26		X	X				
	27		X					

Table 8. Fishes collected in the Lower Cook Inlet region, April 1976 through September 1978.

Family Clupeidae – herrings

Clupea harengus pallasi Valenciennes Pacific herring

Family Salmonidae - trouts

Oncorhynchus gorbuscha (Walbaum) pink salmon

Family Osmeridae - smelts

Mallotus villosus (Müller) capelin
Spirinchus thaleichthys (Ayres) longfin smelt
Thaleichthys pacificus (Richardson) eulachon

Family Bathylagidae - deepsea smelts

Bathylagus schmidti (Rass) northern smoothtongue

Family Myctophidae - lanternfishes

Protomyctophum thompsoni (Chapman) bigeye lanternfish
Stenobrachius leucopsarus (Eigenmann and Eigenmann) northern lampfish

Family Gad idae - codfishes

Gadus sp. Pacific cod
Theragra chalcogramma (Pallas) walleye pollock

Family Zoarcidae - eelpouts

One unidentified species

Family Macrouridae - rattails

One unidentified species

Family Gasterosteidae - sticklebacks

Gasterosteus aculeatus Linnaeus threespine sticklebacks
Pungitius pungitius (Linnaeus) ninespine sticklebacks

Family Scorpaenidae - rockfishes

Sebastes spp. rockfish
Sebastolobus sp. thornyhead

Table 8. (cont.)

Family Hexagrammidae - greenings

Hexagrammos spp. greenling
Hexagrammos stelleri Tilesius whitespotted greenling

Family Cottidae - sculpins

Artedius spp. (Type 1 and Type 2)
Clinocottus sp.
Icelinus borealis Gilbert northern sculpin
Leptocottus armatus Girard Pacific staghorn sculpin
Myoxocephalus sp.
Scorpaenichthys marmoratus (Ayres) cabezon
Cottidae ("Cottid 2" from Blackburn 1973)

Family Agonidae - poachers

Agonus acipenserinus Tilesius sturgeon poacher
Two unidentified species

Family Cyclopteridae - lumpfishes and snailfishes

Eumicrotremus orbis (Günther) Pacific spiny lumpsucker
Liparis sp. snailfish

Family Bathymasteridae - ronquils

Family Stichaeidae - pricklebacks

Anoplarchus sp. cockscomb
Chirolophis sp. warbonnet
Delolepis gigantea Kittlitz giant wry-mouth
Lumpenus spp. prickleback
Lyconectes aleutensis Gilbert dwarf wrymouth

Family Ptilichthyidae - quillfishes

Ptilichthys goodei Bean quillfish

Family Pholidae - gunnels

Family Zaproridae - prowfishes

Zaprora silenus Jordan prowfish

Family Ammodytidae - sand lances

Ammodytes hexapterus Pallas Pacific sand lance

Table 8. (cont.)

Family Tetragonuridae - squaretails

Family Pleuronectidae - righteye flounders

Atheresthes stomias (Jordan and Gilbert) arrowtooth flounder
Glyptocephalus zachirus Lockington rex sole
Hippoglossoides elassodon Jordan and Gilbert flathead sole
Isopsetta isolepis (Lockington) butter sole
Lepidopsetta bilineata (Ayres) rock sole
Limanda aspera (Passas) yellowfin sole
Lyopsetta exilis (Jordan and Gilbert) slender sole
Microstomus pacificus (Lockington) clover sole
Platichthys stellatus (Pallas)? starry flounder
Psettichthys melanostictus Girard sand sole

Table 9. Commercially important species of crab larvae collected in the Lower Cook Inlet region, April 1976 through September 1978.

Order Decapoda

Suborder Reptantia

Section Anomura

Family Lithodidae

Paralithodes camtschatica (Tilesius) Alaska king crab

Section Brachyura

Superfamily Brachyrhyncha

Family Cancridae

Cancer magister Dana Dungeness crab

Superfamily Oxyrhyncha

Family Majidae

Subfamily Oregoniinae

Chionoecetes bairdi Rathbun tanner crab

Table 10. Pandalid shrimp collected in the Lower Cook Inlet region, April 1976 through September 1978.

Order Decapoda

Suborder Natantia

Section Caridea

Family Pandalidae

Pandalopsis dispar Rathbun side stripe shrimp

Pandalus borealis Kröyer northern pink shrimp

Pandalus danae Stimpson dock shrimp

Pandalus goniurus Stimpson bumpy shrimp

Pandalus hypsinotus Brandt coon stripe shrimp

Pandalus montagui tridens Rathbun no common name

Pandalus platyceros Brandt spot shrimp

Pandalus stenolepis Rathbun no common name

Table 11. List of possible fish for egg size categories collected in the Lower Cook Inlet region, April 1976 through September 1978.

<1 mm category (0.73 - 0.88 mm)

Limanda aspera (Pallas) yellowfin sole

∿1 mm category (0.89 - 1.28 mm)

Gadus macrocephalus Tilesius Pacific cod
Isopsetta isolepis (Lockington) butter sole
Parophrys vetulus Girard English sole
Platichthys stellatus (Pallas) starry flounder
Psettichthys melanostictus Girard sand sole

∿2 mm category (1.30 - 2.54 mm)

Bathylagus schmidti (Rass) northern smoothtongue
Glyptocephalus zachirus Lockington rex sole
Lyopsetta exilis (Jordan and Gilbert) slender sole
Microstomus pacificus (Lockington) clover sole
Pleuronectes quadrituberculatus Pallas Alaska plaice
Theragra chalcogramma (Pallas) walleye pollock

∿3 mm category (2.56 - 3.90 mm)

Hippoglossoides elassodon Jordan and Gilbert flathead sole

Table 12. Results of tests of the null hypotheses that seasons and sites did not differ: * indicates a statistically significant difference, $P < 0.05$; N indicates no difference.

Taxonomic Category		Sites	Seasons
Fish Eggs:	<1 mm	*	*
	1 mm	N	*
Fish Larvae:	*Ammodytes*	N	N
	Clupea	N	N
	Gadidae	N	N
	Limanda	N	N
	Mallotus	*	*
	Osmeridae	*	*
Crabs:	Anomura zoea	*	*
	megalopa	N	*
	Brachyura zoea	*	*
	megalopa	*	*
	Cancer magister I	N	N
	II	*	N
	III	*	N
	Cancer spp. I	*	*
	II	*	*
	III	N	*
	IV	*	*
	V	N	N
	megalopa	*	N
	Chionoecetes II	N	N
Shrimps:	*P. borealis* IV	N	N
	P. goniurus V	N	N

Table 13. Use by key species and life history stages of six locations in Lower Cook Inlet, 1976-1977 and 1978.

Key Species and Life History Stages	LOCATION									
	Inner Kachemak		Outer Kachemak		Lower Central		Kamishak		Kennedy Entrance	Kalgin Island
	76-77	78	76-77	78	76-77	78	76-77	78	76-77	76-77
Fish Eggs										
<1 mm	X	X	X	X	X	X	X	X	X	X
∿1 mm	X	X	X	X	X	X	X	X	X	X
∿2 mm	X	X	X	X	X	X	X	X	X	X
∿3 mm		X	X		X				X	
Ammodytes hexapterus										
larvae	X	X	X	X	X	X	X	X	X	X
juveniles										
Clupea harengus pallasi										
larvae		X				X	X	X		X
juveniles										X
Gadidae										
larvae			X	X	X	X			X	X
juveniles			X			X				
Hippoglossoides elassodon										
larvae	X	X	X	X	X	X	X	X	X	X
juveniles							X			

Table 13 continued

Key Species and Life History Stages	LOCATION: Inner Kachemak 76-77	Inner Kachemak 78	Outer Kachemak 76-77	Outer Kachemak 78	Lower Central 76-77	Lower Central 78	Kamishak 76-77	Kamishak 78	Kennedy Entrance 76-77	Kalgin Island 76-77
Limanda aspera										
larvae	X	X		X		X	X	X		
juveniles										
Mallotus villosus										
larvae	X	X	X	X	X	X	X	X	X	X
juveniles	X				X					
Osmeridae										
larvae	X	X	X	X	X	X	X	X	X	X
juveniles										X
Pandalopsis dispar										
stage I	X		X	X					X	
stage II	X			X		X				
stage III	X			X	X	X			X	X
stage IV									X	
stage V										
juveniles										
Pandalus borealis										
stage I	X	X	X		X		X		X	
stage II		X	X		X		X		X	
stage III		X	X	X	X		X			
stage IV	X	X	X	X		X	X	X	X	X
stage V			X	X		X	X			
stage VI										
stage VII										
juveniles										X

Table 13 continued

Key Species and Life History Stages	LOCATION: Inner Kachemak 76-77	Inner Kachemak 78	Outer Kachemak 76-77	Outer Kachemak 78	Lower Central 76-77	Lower Central 78	Kamishak 76-77	Kamishak 78	Kennedy Entrance 76-77	Kalgin Island 76-77
Pandalus danae										
stage I										
stage II		X					X	X		
stage III								X		
stage IV										
stage V						X				X
stage VI										
juveniles										
Pandalus goniurus										
stage I	X	X	X				X		X	X
stage II	X	X	X			X	X	X		
stage III		X	X	X	X	X	X	X		
stage IV	X			X		X		X		
stage V				X		X		X		
stage VI										
stage VII										
juveniles	X									
Pandalus hypsinotus										
stage I	X		X							
stage II				X						
stage III						X				
stage IV				X						
stage V										
stage VI										
juveniles										

Table 13 continued

Key Species and Life History Stages	LOCATION: Inner Kachemak 76-77	Inner Kachemak 78	Outer Kachemak 76-77	Outer Kachemak 78	Lower Central 76-77	Lower Central 78	Kamishak 76-77	Kamishak 78	Kennedy Entrance 76-77	Kalgin Island 76-77
Pandalus platyceros										
stage I										
stage II					X					
stage III										
stage IV										
juveniles										
Pandalus stenolepis										
stage I					X	X			X	
stage II					X	X	X		X	
stage III	X				X	X				
stage IV						X			X	
stage V										
stage VI									X	
juveniles										
Pandalus montagui tridens										
stage I			X		X				X	
stage II					X					
stage III						X			X	
stage IV										
juveniles										
Anomura										
zoea	X	X	X	X	X	X	X	X	X	X
megalopa	X	X	X	X	X	X	X	X	X	X
Brachyura										
zoea	X	X	X	X	X	X	X	X	X	X
megalopa	X	X	X	X	X	X	X	X	X	X

Table 13 continued

Key Species and Life History Stages	Inner Kachemak 76-77	Inner Kachemak 78	Outer Kachemak 76-77	Outer Kachemak 78	Lower Central 76-77	Lower Central 78	Kamishak 76-77	Kamishak 78	Kennedy Entrance 76-77	Kalgin Island 76-77
Paralithodes camtschatica										
stage I	x		x		x		x		x	x
stage II	x		x		X	x	x	x		
stage III		x		x		x	x	x		
stage IV		x		x		x		x		
megalopa						x				x
Cancer *magister*										
stage I	x	x		x		x				
stage II		x	x	x		x		x		
stage III				x		x		x		
stage IV						x				
stage V				x		x				
megalopa				x		x				
Cancer spp.										
stage I	x	x	x	x	x	x	x	x	x	x
stage II	x	x	x	x	x	x	x	x	x	x
stage III	x	x	x	x	x	x	x	x	x	x
stage IV	x		x	x	x	x	x	x	x	x
stage V	x	x	x	x	x	x	x		x	x
megalopa	x		x	x	x	x	x	x	x	x
Chionoecetes bairdi										
stage I	x	x	x	x	x	x	x	X		x
stage 11				x		x				
megalopa	x			x	x	x	x		x	x

Location columns: LOCATION

Table 14. Seasonality-critical periods of use by area during four seasons in Lower Cook Inlet in 1976, 1977, and 1978.

	1976-1977-1978			
Inner Kachemak Bay	Spring	Summer	Fall	Winter
Fish eggs				
<1 mm	X	X	X	
$\sim$1 mm	X	X		
$\sim$2 mm	X			
$\sim$3 mm	X			
Ammodytes hexapterus	X			X
Clupea harengus pallasi	X			
Gadidae				
Hippoglossoides elassodon	X	X		
Limanda aspera	X	X	X	
Mallotus villosus	X	X	X	X
Osmeridae	X	X		X
Pandalopsis dispar	X	X		
Pandalus borealis	X	X		
Pandalus danae	X			
Pandalus goniurus	X	X		
Pandalus hypsinotus	X			
Pandalus platyceros				
Pandalus stenolepis		X		
Pandalus montagui tridens				
Anomura	X	X	X	X
Brachyura	X	X	X	X
Paralithodes camtschatica	X			X
Cancer magister	X	X		
Cancer spp.	X	X	X	X
Chionoecetes bairdi	X	X		

Table 14 continued

Outer Kachemak Bay	Spring	Summer	Fall	Winter
	1976-1977-1978			
Fish eggs				
<1 mm	x	x	x	
∿1 mm	x	x	x	
∿2 mm	x		x	
∿3 mm	x			
Ammodytes hexapterus	x	x		x
Clupea harengus pallasi		x		
Gadidae	x	x		
Hippoglossoides elassodon	x	X		
Limanda aspera	x	X	x	
Mallotus villosus	x	x	x	x
Osmeridae	x	x	x	x
Pandalopsis dispar	x	x		x
Pandalus borealis	x	x		
Pandalus danae				
Pandalus goniurus	x			
Pandalus hypsinotus	x	x		
Pandalus platyceros				
Pandalus stenolepis				
Pandalus montagui tridens	x			
Anomura	x	X	x	x
Brachyura	x	X	x	
Paralithodes camtschatica	x			x
Cancer magister	x	X	x	
Cancer spp.	x	X	x	
Chionoecetes bairdi	X		x	

Table 14. continued

Lower Central Cook Inlet	Spring	Summer	Fall	Winter
	1976-1977-1978			
Fish eggs				
<1 mm	x	x	X	
∿1 mm	x	x		
∿2 mm	x	x		
∿3 mm	x			
Ammodytes hexapterus	x	x		
Clupea harengus pallasi	x	x		
Gadidae	x	x		
Hippoglossoides elassodon	x	x		
Limanda aspera	x	x	x	
Mallotus villosus	x	x	x	
Osmeridae	x	x	x	x
Pandalopsis dispar	x			
Pandalus borealis	x	x		
Pandalus danae	x			
Pandalus goniurus	x	x		
Pandalus hypsinotus		x		
Pandalus platyceros				x
Pandalus stenolepis	x	x		
Pandalus montagui tridens	x			
Anomura	x	x	x	
Brachyura	x	x	x	
Paralithodes camtschatica	x			
Cancer magister	x	x	x	
Cancer spp.	x	x	x	
Chionoecetes bairdi	x	x		

Table 14 continued

Kamishak Bay	1976-1977-1978 Spring	Summer	Fall	Winter
Fish eggs				
<1 mm	x	x	x	
~1 mm	x	x		
~2 mm	x	x		
~3 mm				
Ammodytes hexapterus	x			
Clupea harengus pallasi	x	x		
Gadidae				
Hippoglossoides elassodon	X	X		
Limanda aspera	x	x		
Mallotus villosus	x	x	x	
Osmeridae	x	x	x	x
Pandalopsis dispar				
Pandalus borealis	x	x		
Pandalus danae	x	x		
Pandalus goniurus	X	x		
Pandalus hypsinotus				
Pandalus platyceros				
Pandalus stenolepis		x		
Pandalus montagui tridens				
Anomura	x	x	x	
Brachyura	X	x	x	
Paralithodes camtschatica	X	x		
Cancer magister	x	x	x	
Cancer spp.	X	x	x	
Chionoecetes bairdi	X			

Table 14 continued

Kennedy Entrance	Spring	Summer	Fall	Winter
	1976-1977-1978			
Fish eggs				
<1 mm		x		
∿1 mm	x	x		
∿2 mm	x	x		
∿3 mm	x	x		
Ammodytes hexapterus	x			
Clupea harengus pallasi				
Gadidae	x	x		
Hippoglossoides elassodon		x		
Limanda aspera				
Mallotus villosus	x	x		
Osmeridae		x	x	
Pandalopsis dispar	x	x		
Pandalus borealis	x	x		
Pandalus danae				
Pandalus goniurus	x			
Pandalus hypsinotus				
Pandalus platyceros				
Pandalus stenolepis	x	x		
Pandalus montagui tridens	x	x		
Anomura	x	x		
Brachyura	x	x		x
Paralithodes camtschatica	x			
Cancer magister		x	x	
Cancer spp.		x	x	
Chionoecetes bairdi	x	x		

Table 14 continued

Kalgin Island	1976-1977-1978 Spring	Summer	Fall	Winter
Fish eggs				
<1 mm		X		
∿1 mm	X			
∿2 mm	X	X		
∿3 mm				
Ammodytes hexapterus	X			X
Clupea harengus pallasi		X	X	
Gadidae	X			
Hippoglossoides elassodon		X		
Limanda aspera				
Mallotus villosus		X		
Osmeridae		X		
Pandalopsis dispar		X		
Pandalus borealis		X		
Pandalus danae		X		
Pandalus goniurus	X			
Pandalus hypsinotus				
Pandalus platyceros				
Pandalus stenolepis				
Pandalus montagui tridens				
Anomura	X	X	X	X
Brachyura	X	X		X
Paralithodes camtschatica	X	X		
Cancer magister		X		X
Cancer spp.		X	X	X
Chionoecetes bairdi	X	X		

APPENDIX A

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APPENDIX B

Density per 10 square meters

1976-1977.

FISH EGGS/10 SQ M

$TATION	SIZE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	<1 MM	0	0	0	4	0	0	0
	1 MM	0	2	0	1	0	0	0
	2 MM	1	2	2	0	0	0	0
	3 MM	0	87	96	0	0	0	0
2	<1 MM	0	1	0	2	0	0	0
	1 MM	0	0	12	35	0	0	0
	2 MM	0	1	1	1	0	0	0
	3 MM	0	0	1	0	0	0	0
3	<1 MM	0	0	0	2	0	0	0
	1 MM	11	80	281	0	0	0	0
	2 MM	0	11	8	1	0	0	0
	3 MM	0	0	0	0	0	0	0
4	<1 MM	0	0	0	3	0	0	0
	1 MM	0	0	3	0	0	0	0
	2 MM	0	0	1	0	0	0	0
	3 MM	0	0	0	0	0	0	0
5	<1 MM	0	0	1	438	30	0	0
	1 MM	1	100	138	90	2	0	0
	2 MM	0	5	5	0	0	0	0
	3 MM	0	0	3	0	0	0	0
6	<1 MM	0	0	16	291	21	0	0
	1 MM	21	5550	2701	3	1	0	0
	2 MM	2	0	0	0	0	0	0
	3 MM	0	0	0	0	0	0	0
7	<1 MM	0	0	62	290	0	0	0
	1 MM	101	96	1485	52	0	0	0
	2 MM	0	1	2	0	1	0	0
	3 MM	0	0	0	0	0	0	0
8	<1 MM		0	144	811	0	0	0
	1 MM		938	712	49	0	0	0
	2 MM		10	1	0	0	0	0
	3 MM		0	0	0	0	0	0

CONTINUATION-FISH EGGS/10 SQ M

9	<1 MM	o	0		3	0	0	0
	1 MM	1	30		3	0	0	0
	2 MM	1	3		1	0	0	0
	3 MM	0	26		1	1	0	0
10	<1 MM	0		4	0	1		0
	1 MM	3		4	2	0		0
	2 MM	0		27	1	0		0
	3 MM	0		14	2	0		0

HIP POGLOSSOIDES SP./10 SC M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	0	0	45	7	0	0	0
	JUV	0	0	0	0	0	0	0
2	LAR	0	0	1	2	1	0	0
	JUV	0	0	0	G	0	0	0
3	LAR	o	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
4	LAR	0	0	0	0	1	0	0
	JUV	0	0	0	0	0	0	0
5	LAR	c	0	6	1	0	0	0
	JUV	o	0	0	0	0	0	0
6	LAR	0	0	0	2	0	0	0
	JUV	0	0	0	0	0	0	0
7	LAR	0	0	0	48	0	0	0
	JUV	0	0	0	G	1	0	0
8	LAR		0	0	15	0	0	0
	JUV		0	0	0	0	0	0
9	LAR	0	0		8	2	0	0
	JUV	0	0		0	0	0	0
10	LAR	0		0	12	0		0
	JUV	0		0	0	0		0

GADIDAE/10 SO M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	0	26	5	0	0	0	0
	JUV	0	0	0	0	0	o	0
2	LAR	0	13	2	0	0	0	0
	JUV	0	0	0	0	0	0	0

CONTINUATION-GADIOAE/lC S0 M

3	LAR	o	0	1	o	o	o	0
	JUV	0	c	0	0	0	0	0
4	LAR	o	1	0	0	c	0	0
	JUV	0	0	0	0	o	0	0
5	LAR	0	o	0	1	0	0	0
	JUV	0	0	0	0	1	0	0
6	LAR	o	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	LAR	o	0	0	C	0	0	0
	JUV	0	0	c	o	0	0	0
8	LAR		o	o	0	0	0	o
	JUV		0	0	0	0	0	0
9	LAR	14	4		4	0	0	0
	JUV	C	0		0	0	0	0
10	LAR	o		0	0	0		c
	JUV	0		0	0	0		o

OSMERIDAE/10 S9 M

STATION	STAGE	APP 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	0	0	0	752	659	2	0
	JUV	0	0	0	0	0	0	0
2	LAR	0	3	C	571	137	0	29
	JUV	0	0	0	0	0	0	0
3	LAR	0	0	0	21	29	0	0
	JUV	0	0	0	0	0	0	1
4	LAR	o	o	0	351	0	0	0
	JUV	0	0	0	0	0	0	0
5	lAR	o	0	0	368	224	0	1
	JUV	0	0	0	0	0	0	0
6	LAR	o	1	0	0	275	0	1
	JUV	0	0	0	0	0	0	0

CONTINUATION-OSMERIDAE/ 10 SC M

7	LAR	0	0	c	51	8	2	1
	JUV	0	0	0	0	0	0	0
8	LAR		0	0	2	2	0	o
	JUV		0	0	0	0	0	0
9	LAR	0	0		207	49	2	4
	JUV	0	0		0	0	0	0
10	LAR	0		0	238	17		0
	JUV	0		0	0	0		0

MALLOTUS VILLOSUS/10 S9 M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	5	11	0	2505	233	17	0
	JUV	0	0	0	0	0	o	0
2	LAR	o	0	0	633	85	9	0
	JUV	0	o	0	0	1	0	0
3	lAR	o	0	0	346	11	0	0
	JUV	0	0	0	0	0	0	0
4	lAR	o	0	0	412	2	0	0
	JUV	0	0	0	0	0	0	0
5	LAR	o	0	0	560	272	0	1
	JUV	0	0	0	0	0	0	0
6	LAR	o	0	0	14	1383	1	0
	JUV	0	0	0	0	0	0	1
7	LAR	o	0	0	299	21	0	0
	JUV	0	0	0	0	0	0	0
8	LAR		0	0	40	144	7	0
	JUV		0	G	0	0	0	0
9	LAR	7	0		170	49	0	0
	JUV	0	0		0	0	0	0
10	LAR	o		o	85	15		0
	JUV	0		0	0	0		0

CL UPEA HARENGUS PA LLASI /10 S0 P

STATICN	STAGE	APR 6-13	PAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAP	o	o	0	0	0	o	o
	JUV	0	0	C	0	o	0	0
2	LAR	0	0	o	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	LAR	0	0	0	0	0	0	0
	JUV	0	o	0	C	o	0	0
4	LAR	0	0	0	31	4	0	0
	JUV	0	0	0	0	0	1	0
5	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
6	LAR	o	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	LAR	o	0	0	c	0	0	0
	JUV	0	c	0	o	0	0	o
8	LAR		c	0	5	0	0	0
	JUV		0	0	0	0	0	0
9	LAR	o	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	LAR	0		0	0	0		0
	JUV	0		0	0	0		0

AMMODYTES HEXAPTERUS/10 S0 M

STATION	STAGE	API? 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	5	o	8	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	LAR	0	2	30	0	0	0	c
	JUV	0	o	0	0	0	0	0
3	LAR	13	28	3	0	0	0	13
	JUV	0	0	0	0	0	0	0

CONTINUATION-AMMODYTES HEXAPTERUS/10 SC M

4	LAR	C	1	5	0	0	0	0
	JUV	0	0	0	0	0	0	0
5	LAR	1	324	155	0	0	0	7
	JUV	0	0	C	0	0	0	0
6	LAR	10	394	1	0	0	0	22
	JUV	C	0	0	0	0	0	0
7	LAR	9	1	24	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	LAR		47	9	0	0	0	0
	JUV		0	0	0	0	0	0
9	LAR	1	2		0	0	0	0
	JUV	0	0		0	0	0	0
10	LAR	1		0	0	0		0
	JUV	0		0	0	0		0

ANOMURA/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	ZOE	12	346	438	534	854	0	0
	MEG	0	0	0	0	30	0	0
2	ZOE	0	199	3363	181	132	17	0
	MEG	0	0	0	16	14	0	0
3	ZOE	0	0	25	674	2	0	6
	MEG	0	0	0	0	4	1	0
4	ZOE	0	1	1	15	7	0	0
	MEG	0	0	0	1	4	0	0
5	ZOE	0	951	777	1064	1170	7	1
	MEG	0	0	0	0	3	8	0
6	ZOE	22	248	7	238	304	0	50
	MEG	0	0	0	9	4	0	0
7	ZOE	0	33	208	550	16	1	0
	MEG	0	0	0	0	4	1	0
8	ZOE		47	953	16	222	1	0
	MEG		0	0	0	10	1	0
9	ZOE	0	86		547	24	0	0
	MEG	0	0		24	1	0	0
10	ZOE	0		16	12	0		0
	MEG	0		0	0	0		0

BRACHYURA/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	ZOE	0	274	1479	1216	53	0	0
	MEG	0	0	0	365	7	0	0
2	ZOE	0	330	3747	402	231	0	0
	MEG	0	0	0	96	34	0	0

CONTINUATION-BRACHYURA/10 SQ M

3	ZOE	0	35	1030	773	73	0	1
	MEG	0	0	0	65	5	0	0
4	ZOE	0	0	63	16	199	0	0
	MEG	0	0	0	1	1	0	0
5	ZOE	0	286	3535	1529	1056	1	0
	MEG	0	0	0	46	9	0	0
6	ZOE	0	1131	5639	608	395	0	267
	MEG	0	0	0	0	10	0	0
7	ZOE	0	32	256	2446	0	2	0
	MEG	0	0	0	69	1	0	0
8	ZOE		9	3026	22	414	0	0
	MEG		0	0	2	10	0	0
9	ZOE	0	122		1310	5	0	1
	MEG	0	0		1554	1	0	0
10	ZOE	0		113	28	3		0
	MEG	0		0	102	1		0

CANCER MAGISTER/10 S° M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	0	0	0	0	0
	II	0	0	0	0	1	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	1	2	0
	MEG	0	0	0	0	1	63	0
2	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	[illegible]	0	0
	MEG	0	0	0	0	0	0	0
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
5	I	0	0	0	0	0	0	0
	II	0	0	0	3	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	1	0	0
6	I	0	0	0	2	0	0	0
	II	0	0	0	0	[illegible]	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
7	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0

CUNTINUATIUN-CANCER MAGISTER/10 S9 M

8	I		o	0	o	0	0	0
	II		0	0	0	0	0	0
	III		0	0	0	2	0	0
	IV		0	0	0	0	0	0
	V		0	0	0	0	0	0
	MEG		0	0	0	2	0	0
9	I	o	o		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	V	0	0		0	0	0	0
	MEG	0	0		0	1	0	0
10	I	o		0	0	0		0
	II	0		0	0	0		0
	III	0		0	0	0		0
	IV	0		0	0	0		0
	V	0		0	0	0		0
	MEG	0		o	0	0		0

CANCER SPP./10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	9	8	3112	0	0	0
	II	0	o	Q	1093	o	0	0
	III	0	o	0	89	37	c	o
	IV	0	0	u	3	90	0	0
	V	0	0	0	0	122	0	0
	MEG	0	0	0	u	20	c	o
2	I	0	1	0	26?	4	0	0
	II	0	0	0	369	11	0	0
	III	0	0	u	22	168	o	0
	IV	0	o	0	0	796	0	0
	V	0	o	0	0	318	0	o
	MEG	0	0	0	0	27	13	0

3	I	0	0	0	6426	1	0	1
	II	0	0	0	899	1	0	0
	III	0	0	0	37	12	0	0
	IV	0	0	0	0	36	0	0
	V	0	0	0	0	25	0	0
	MEG	0	0	0	0	1	0	0
4	I	0	0	0	10	0	0	0
	II	0	0	0	4	3	0	0
	III	0	0	0	0	6	0	0
	IV	0	0	0	0	39	0	0
	V	0	0	0	0	6	0	0
	MEG	0	0	0	0	1	0	0
5	I	0	0	0	6378	1	0	0
	II	0	0	0	359	1	0	0
	III	0	0	0	3	34	0	0
	IV	1	0	0	0	339	0	0
	V	0	0	3	0	113	0	0
	MEG	0	0	0	0	44	8	0
6	I	0	0	0	134	3	0	41
	II	0	0	0	9	7	0	0
	III	0	0	0	0	60	0	0
	IV	0	0	0	0	185	0	0
	V	0	0	0	0	130	0	0
	MEG	0	0	0	0	48	0	0
7	I	0	0	0	4	0	0	0
	II	0	0	0	1	2	0	0
	III	0	0	0	0	10	0	0
	IV	0	0	0	0	15	0	0
	V	0	0	0	0	7	0	0
	MEG	0	0	0	0	1	11	0
8	I		0	0	0	0	0	0
	II		0	0	0	0	0	0
	III		0	0	0	80	0	0
	IV		0	0	0	494	0	0
	V		0	0	0	288	0	0
	MEG		0	0	0	2	2	0
9	I	0	0		164	0	0	0
	II	0	0		87	0	0	0
	III	0	9		158	7	0	0
	IV	0	0		0	35	0	0
	V	0	0		0	181	1	0
	MEG	0	0		0	70	0	0

CONTINUATION-CANCER SPP./10 SQ M

10	I	0		0	2	0		
	II	0		0	63	0		
	III	0		0	27	1		0
	IV	0		0	2	3		
	V	0		0	0	14		0
	MEG	0		0	0	3		

CHIONOECETES BAIRDI/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21 26
1	I	0	1	23	3	0	0	0
	II	0	0	0	211	0	0	0
	MEG	0	2	10	0	3	2	0
2	I	0	0	378	0	0	0	0
	II	0	0	0	1	0	0	0
	MEG	0	10	0	0	8	0	0
3	I	0	1	10	3	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	2	0	0	1	0	0
4	I	0	1	0	2	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	0	1	0	0	0	0
5	I	0	763	942	0	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
6	I	0	0	419	0	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	0	0	0	1	0	0
7	I	0	0	18	0	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	1	0	0	0	0	6
8	I		0	22	0	0	0	0
	II		0	0	0	0	0	0
	MEG		1	2	0	0	0	0

CONTINUATION-CHIONOECETES BAIRDI/10 SQ M

9	I	0	0		0	0	0	0
	II	0	0		0	0	0	0
	MEG	1	2		0	2	0	0
10	I	0		40	0	0		0
	II	0		0	6	0		0
	MEG	1		5	0	0		0

PARALITHODES CAMTSCHATICA/10 SQ M

STATION	STAGE	APR 0-13	MAY 6-9	MAY 22-30	JUL 6-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	7	0	0	0	0
	II	0	0	6	0	0	0	0
	III	0	0	5	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
2	I	0	0	2	0	0	0	0
	II	0	0	30	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	1	0	0	0
3	I	0	2	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	7	0	0	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
5	I	0	546	0	0	0	0	10
	II	0	322	153	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0

CONTINUATION-PARALITHODES CAMTSCHATICA/10 SQ M

6	I	1	259	0	0	0	0	4
	II	1	143	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
7	I	0	434	37	0	0	0	0
	II	0	1	461	0	0	0	0
	III	0	0	51	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	1	0	0	0
8	I		361	0	0	0	0	0
	II		7	85	0	0	0	0
	III		0	104	0	0	0	0
	IV		0	0	0	0	0	0
	MEG		0	0	0	0	0	0
9	I	0	39		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	MEG	0	0		0	0	0	0
10	I	0		0	0	0		0
	II	0		0	0	0		0
	III	0		0	0	0		0
	IV	0		0	0	0		0
	MEG	0		0	0	0		0

PANCALOPSIS DISPAR/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 6-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	G	"C	o	o	o
	II	0	c	i	C	0	C	0
	III	0	c	C	c	0	0	0
	IV	0	o	C	0	0	0	0
	V	0	0	c	c	o	0	0
	JUV	0	0	C	o	0	0	0
2	I	0	0	C	0	0	0	0
	II	0	c	C	0	0	C	0
	III	0	o	1	0	0	0	0
	IV	0	c	0	o	0	0	0
	V	0	o	C	0	0	c	0
	JUV	0	0	C	0	0	C	0
3	1	0	0'	c	o	0	0	c
	11	0	c	C	C	0	0	0
	III	0	C	G	3	0	0	0
	IV	0	c	o	0	0	c	0
	V	0	0	C	0	0	o	0
	JUV	0	0	c	o	0	0	G
4	1	0	c	G	C	0	c	C
	II	0	o	C	o	0	o	o
	111	0	0	C	0	0	0	0
	IV	0	C	0	0	o	c	c
	v	0	0	G	C	0	C	o
	JUV	0	0	0	0	0	C	G
5	I	0	c	G	c	0	o	6
	II	0	c	0	o	0	0	C
	III	0	o	C	0	0	0	o
	IV	0	0	C	C	0	c	0
	V	0	0	C	o	0	0	0
	JUV	0	0	C	0	0	c	0
6	I	1	0	0	0	0	c	0
	II	0	2	C	o	0	0	0
	III	0	c	C	0	1	c	c
	IV	0	0	0	C	0	c	o
	V	0	o	0	o	0	c	0
	JUV	0	C	c	C	0	c	c

CUliTINUATIUN-PANDALUPSIS DISPAR/10 SQ M

7	I	0	0	C	0	C	c	0
	II	o	o	L	G	0	c	0
	III	u	0	C	0	0	C	0
	IV	0	C	0	0	0	c	0
	V	0	o	C	0	0	0	0
	JUV	0	c	L	0	0	C	0
L	I		c	0	0	0	c	G
	II		o	L	C	0	0	0
	III		G	c	0	0	c	0
	IV		o	U	0	0	0	0
	V		0	o	0	0	0	0
	JUV		c	G	C	0	c	c
9	I	1	o		0	0	0	0
	II	0	0		0	0	0	0
	III	0	c		1	0	c	0
	IV	0	o		0	1	0	0
	V	0	0		0	0	0	0
	JUV	0	0		C	0	0	0
10	I	0		1	0	0		0
	11	0		C	C	0		0
	111	0		1	0	0		0
	IV	0		0	0	0		0
	v	0		C	0	0		0
	JUV	0		C	0	0		0

PANDALUS BOREALIS/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	A(JG 24-31	OCT 17-29	FEB 21-26
1	I	0	34	0	0	0	0	0
	II	o	23	1C	0	0	0	0
	III	0	c	55	0	0	c	0
	IV	0	0	2	1	0	0	0
	v	“ o	c	C	2	1	c	G
	VI	0	C	C	0	0	0	0
	VII	0	0	u	0	0	0	0
	JUV	0	0	0	c	5	0	0

CONTINUATION-PANDALUS BOREALIS/10 SQ M

2	I	0	1	1	0	0	0	0
	II	0	1	0	0	0	0	0
	III	0	0	1	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	156	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	1	0	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	1	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	1	0	0
5	I	0	211	18	0	0	0	0
	II	0	76	5	0	0	0	0
	III	0	0	42	0	0	0	0
	IV	0	0	5	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
6	I	1	618	0	0	0	0	0
	II	0	18	5	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	1	2	0	0
	V	0	0	0	1	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0

CONTINUATION-PANDALUS BOREALIS/10 SQ M

7	I	0	17	u	c	0	c	0
	II	0	0	C	o	0	c	o
	III	0	c	C	1	0	C	U
	IV	U	C	u	53	0	c	0
	V	0	o	C	1	0	o	o
	VI	0	c	C	0	0	0	0
	VII	C	o	U	U	0	0	0
	JUV	0	c	C	0	0	c	0
8	I		o	1	0	0	C	o
	II		c	1	c	0	o	0
	III		c	0	c	0	0	0
	IV		0	0	1	0	c	0
	V		o	0	0	0	c	0
	VI		G	0	c	0	o	0
	VII		G	0	c	0	0	o
	JUV		c	0	G	0	c	0
9	I	0	69		o	0	c	0
	II	0	34		0	0	o	0
	III	0	0		0	0	c	c
	IV	0	0		5	o	o	o
	V	0	0		0	0	0	G
	VI	0	0		o	0	c	G
	VII	0	0		0	0	c	o
	JUV	0	0		c	0	0	0
10	I	0		G	C	G		0
	II	0		1	G	0		0
	III	0		5	7	0		0
	IV	0		2	8	o		0
	V	0		G	2	0		C
	VI	0		o	C	0		C
	VII	0		0	c	0		o
	JUV	0		C	0	0		0

PANDALUS DANAE/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	0	0	0	c	0
	II	0	c	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	C	0	0	0	0	0
	V	0	0	0	c	1	0	0
	VI	0	G	0	0	0	0	0
	JUV	0	0	0	0	0	c	0
2	I	0	0	0	0	0	0	c
	II	0	0	0	0	0	0	0
	III	0	0	0	c	0	c	0
	IV	0	0	0	0	0	c	0
	V	0	0	G	0	0	c	0
	VI	0	C	0	G	0	0	cl
	JUV	0	0	0	0	0	0	0
3	I	0	c	0	0	0	0	0
	II	0	0	0	c	0	c	0
	III	0	0	0	0	0	0	0
	IV	0	c	0	0	0	c	0
	V	0	0	0	2	0	0	0
	VI	0	0	0	G	0	c	0
	JUV	0	0	L!	G	0	c	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	c	G	0	0	0	0
	IV	0	c	0	0	0	c	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	c	0
	JUV	0	0	0	0	0	c	0
5	I	0	0	c	c	0	c	c
	II	0	0	0	0	0	0	0
	III	0	C	0	0	0	c	0
	IV	0	C	0	0	0	c	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	c	0
	JUV	0	0	0	0	0	c	0

CONTINUATION-PANDALUS DANAE/10 SQ M

6	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	I	0	0	0	0	0	0	0
	II	0	0	0	1	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	I		0	0	0	0	0	0
	II		0	0	0	0	0	0
	III		0	0	0	0	0	0
	IV		0	0	0	0	0	0
	V		0	0	0	0	0	0
	VI		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	0	0		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	V	0	0		0	0	0	0
	VI	0	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	I	0		0	0	0		0
	II	0		0	0	0		0
	III	0		0	0	0		0
	IV	0		0	0	0		0
	V	0		0	0	0		0
	VI	0		0	0	0		0
	JUV	0		0	0	0		0

PANDALUS GONIURUS/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-$1	MAY 22-30	JUL 6-15	AUG 24 31	OCT 17-29	FEB 21-26
1	I	0	G	0	0	0	0	0
	II	C	C	1	C	0	0	0
	III	0	c	0	C	0	0	0
	IV	0	C	0	C	0	C	0
	V	o	G	C	G	0	C	0
	VI	0	0	0	0	0	0	0
	VII	o	0	0	C	0	0	c
	JUV	0	0	0	0	0	c	0
2	I	0	0	0	c	0	0	0
	II	0	c	0	0	0	0	0
	III	0	c	1	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	C	0	0	0	0
	VI	0	c	0	0	0	c	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	c	0
3	I	0	1	6	0	0	0	0
	11	0	0	0	0	0	0	0
	111	0	G	C	0	0	c	G
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	c	C	G	0	0	0
	VII	0	0	C	0	0	0	0
	JUV	0	c	0	0	0	0	0
4	I	0	1	0	0	0	0	c
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	c	c
	IV	0	0	0	c	0	0	0
	V	0	G	0	0	0	0	0
	VI	0	c	0	c	G	0	0
	VII	0	0	0	C	0	0	0
	JUV	0	0	0	0	0	c	0
5	I	C	1146	42	0	0	0	0
	II	o	172	1176	0	0	0	0
	III	0	0	666	0	0	0	0
	IV	0	c	0	0	0	c	0
	V	0	0	0	0	0	0	c
	VI	0	c	0	0	0	c	c
	VII	0	0	0	0	0	c	0
	JUV	0	0	C	0	0	0	0

CONTINUATION-PANDALUS GONIURUS/10 SQ M

6	I	1	2109	9	0	0	0	0
	II	0	0	9	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	7	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	1	0	0	0
7	I	0	88	699	0	0	0	0
	II	0	0	3666	0	0	0	0
	III	0	0	322	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	I		874	1	0	0	0	0
	II		15	27	0	0	0	0
	III		0	6	0	0	0	0
	IV		0	0	0	0	0	0
	V		0	0	0	0	0	0
	VI		0	0	0	0	0	0
	VII		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	0	38		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	V	0	0		0	0	0	0
	VI	0	0		0	0	0	0
	VII	0	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	I	0		0	0	0		0
	II	0		1	0	0		0
	III	0		0	0	0		0
	IV	0		0	0	0		0
	V	0		0	0	0		0
	VI	0		0	0	0		0
	VII	0		0	0	0		0
	JUV	0		0	0	0		0

PANDALUS HYPSINOTUS/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	o	0	0	0	0	0	0
	II	0	0	0	0	0	c	0
	III	o	0	0	c	0	c	0
	IV	0	0	G	0	0	c	0
	V	0	0	G	Q	0	0	0
	VI	0	c	c	0	0	c	C
	JUV	0	0	o	0	0	c	0
2	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	c	0
	IV	0	c	0	0	0	c	0
	V	0	o	0	0	0	0	0
	VI	0	0	0	0	0	c	0
	JUV	0	0	0	0	0	c	0
3	I	0	0	0	c	0	0	0
	II	0	c	0	0	0	0	C
	III	0	c	u	C	0	0	0
	IV	0	o	c	0	0	0	G
	V	0	0	0	0	0	0	0
	VI	0	G	0	0	0	0	0
	JUV	0	o	0	C	0	0	0
4	I	0	c	C	0	0	c	G
	II	0	o	0	0	0	0	0
	III	0	0	G	0	0	0	G
	IV	0	G	C	0	0	0	0
	V	0	c	o	0	0	0	0
	VI	0	o	0	0	0	c	0
	JUV	0	c	0	C	0	0	0
5	I	0	1	3	0	0	C	0
	II	0	0	0	0	0	c	0
	III	0	c	C	0	0	0	0
	IV	0	c	C	C	0	c	c
	V	0	c	0	c	0	0	0
	VI	0	o	o	G	0	C	0
	JUV	0	0	C	0	0	0	0

CONTINUATION-PANDALUS HYPSINOTUS/10 SQ M

6	I	0	1	C	U	0	c	U
	II	0	0	U	C	0	o	U
	III	0	0	C	C	o	c	C
	IV	0	C	U	U	0	o	0
	V	0	0	U	0	0	0	0
	VI	0	0	U	C	0	0	0
	JUV	0	0	0	C	0	c	0
7	I	0	0	0	0	0	o	0
	II	0	c	U	C	0	0	0
	III	0	o	U	C	0	0	U
	IV	0	c	0	U	0	0	0
	V	0	0	C	C	0	0	U
	VI	0	0	U	0	0	0	U
	JUV	0	C	L	C	o	C	u
8	I		o	0	0	0	o	U
	II		0	0	C	0	0	C
	III		0	C	0	0	c	0
	IV		0	0	0	0	o	G
	V		0	0	0	0	c	o
	VI		c	U	C	0	o	0
	JUV		c	0	0	0	c	0
9	I	0	o		0	0	o	G
	II	0	0		0	0	0	o
	III	0	c		0	o	0	0
	IV	0	c		0	0	0	0
	V	0	o		0	0	0	0
	VI	0	0		U	0	0	0
	JUV	0	0		0	0	0	0
10	I	0		0	0	0		o
	II	o		C	C	0		G
	III	0		C	0	0		o
	IV	0		0	0	0		G
	V	0		0	C	0		o
	VI	0		0	0	0		0
	JUV	0		0	0	0		0

PANDALUS PLATYCERUS/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-24	FEB 21-26
1	I	o	C	C	C	0	0	c
	II	0	c	C	0	c	C	o
	III	0	c	0	G	o	c	c
	IV	0	C	0	0	0	c	o
	JUV	0	G	G	C	0	o	0
2	I	0	o	G	0	0	0	0
	II	0	0	0	C	0	c	1
	111	0	C	G	o	0	c	G
	IV	0	o	0	c	0	c	c
	JUV	0	C	0	0	0	c	c
3	I	0	C	0	0	0	0	o
	II	0	o	o	0	0	0	c
	III	0	c	0	0	0	c	c
	IV	0	o	0	0	0	o	o
	JUV	0	c	C	0	0	c	C
4	I	0	o	0	C	0	o	o
	11	0	0	0	o	0	0	0
	111	0	c	C	0	0	c	0
	IV	0	C	o	0	0	0	G
	JUV	0	c	0	C	0	C	o
5	I	0	G	G	o	0	o	0
	II	0	c	C	0	0	0	0
	III	0	C	c	G	0	o	0
	IV	0	o	o	o	0	0	0
	JUV	0	c	C	0	0	c	C
6	I	0	G	0	0	0	o	o
	11	0	o	o	c	0	0	0
	III	0	c	0	C	0	0	C
	IV	o	C	G	G	0	0	o
	JUV	0	o	C	o	0	c	0
7	I	0	0	o	C	0	c	0
	II	0	c	C	o	0	o	0
	III	0	c	C	0	0	c	C
	IV	0	G	o	C	0	o	o
	JUV	0	o	0	0	0	c	0

CONTINUATION-PANDALUS PLATYCEROS/10 SQ M

8	I		C	C	C	O	C	C
	II		o	C	C	O	o	O
	III		C	O	C	O	c	O
	IV		c	C	C	O	c	O
	JUV		c	C	O	O	c	C
9	I	G	c		C	C	0	c
	II	o	o		o	o	c	o
	III	0	c		G	0	c	c
	IV	O	c		o	0	C	o
	JUV	0	C		G	0	o	0
10	I	o		C	C	0		o
	II	0		O	c	0		0
	III	0		C	o	0		0
	IV	0		C	C	0		0
	JUV	0		O	o	C		0

PANDALUS STENOLEPIS/10 SQ M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	o	9	6	1	0	0	0
	II	0	C	3	5	0	0	O
	III	0	O	0	9	0	0	0
	IV	0	O	c	7	0	c	o
	V	0	O	o	2	0	1?	o
	VI	0	O	C	1	0	c	o
	JUV	0	C	o	0	0	0	0
2	I	o	1	C	o	0	0	0
	II	0	0	1	C	o	0	0
	III	0	0	1	C	o	C	o
	IV	0	0	0	0	0	0	0
	V	0	0	G	0	0	0	0
	VI	0	c	C	0	0	G	o
	JUV	0	o	O	c	o	0	C
3	I	o	0	O	o	0	c	o
	II	0	G	O	0	0	C	o
	III	0	o	O	u	o	0	0
	IV	0	0	O	0	0	c	o
	V	O	c	C	C	o	O	G
	VI	0	o	O	G	o	c	o
	JUV	0	0	O	O	O	0	0

CONTINUATION-PANDALUS STENOLEPIS/10 SQ M

4	I	0	C	0	0	o	c	C
	II	0	c	0	0	0	C	Q
	III	C	C	C	0	0	c	c
	IV	0	C	C	0	0	o	o
	V	0	o	0	0	0	0	0
	VI	0	c	0	0	0	0	0
	JUV	0	G	0	0	0	c	0
5	I	0	o	0	0	0	C	0
	II	0	c	C	C	0	o	G
	III	0	o	0	G	0	0	o
	IV	0	0	0	c	0	0	0
	V	0	0	C	c	0	c	0
	VI	0	0	0	0	0	o	0
	JUV	0	c	C	o	0	c	0
6	I	0	o	0	0	0	o	0
	II	0	0	0	0	0	0	c
	III	0	c	0	2	0	c	o
	IV	0	o	0	0	0	c	0
	V	0	0	0	0	0	c	0
	VI	0	0	0	0	0	a	0
	JUV	0	0	0	C	0	0	0
7	I	0	0	0	0	0	c	0
	II	0	C	0	C	0	0	0
	III	0	o	0	0	0	0	0
	IV	0	c	C	0	0	c	c
	V	0	o	0	0	0	o	o
	VI	0	0	0	C	0	0	0
	JUV	0	o	0	0	0	0	0
b	I		0	C	0	0	0	0
	II		0	0	1	0	0	o
	III		c	C	0	0	0	0
	IV		C	0	0	0	0	0
	V		0	0	G	0	0	0
	VI		c	0	0	0	c	0
	JUV		o	0	0	0	o	0
9	I	0	36		11	0	0	C
	II	0	2		0	0	0	G
	III	0	0		0	0	0	o
	IV	0	0		1	0	C	0
	V	0	c		0	0	o	0
	VI	0	c		C	1	c	0
	JUV	0	o		C	0	o	0

CCNIINLATIUN-PANCALUS STENULEPIS/1U SG M

1C	I	o	C	0	C
	II	0	0	c	0
	1 1 1	0	U	1	0
	IV	0	G	1	0
	V	0	C	1	0
	VI	0	0	0	1
	JUV	0	C	0	0

PANDALUS MUNTAGUITRIDENS/10 S9 M

STATICN	STAGE	APR 6-13	MAY 6-9	MAY 22-3C	JUL 8-15	AIJG 24-31	OCT 17-29	FEB 21-26
1	I	0	153	7	C	0	c	o
	11	0	c	76	o	0	o	0
	III	0	c	5	0	0	0	0
	IV	0	c	0	0	0	0	0
	JUV	0	0	C	G	0	0	0
2	I	0	1	0	o	0	0	0
	II	0	0	1	0	0	c	0
	III	0	0	0	0	0	o	0
	IV	0	c	C	c	0	0	C
	JUV	0	0	C	0	0	0	o
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	c	0
	111	0	0	0	0	0	o	0
	IV	0	C	0	o	0	C	0
	JUV	0	0	C	0	0	o	0
4	I	0	0	C	C	0	0	C
	II	0	0	C	0	0	C	o
	III	0	0	0	o	0	c	0
	IV	0	c	0	0	0	o	C
	JUV	0	0	0	0	0	0	o
5	I	0	1	0	0	0	0	0
	11	0	0	C	0	0	c	0
	ill	0	0	0	0	0	C	0
	IV	0	0	C	0	0	c	0
	JUV	0	c	0	c	0	c	0

CUNTINCATIUN-PANUALUS MONTAGUI TRIDENS/10 SQ M

b	I	0	0	0	0	0	0	G
	II	0	C	C	C	0	0	o
	III	0	0	0	C	G	0	0
	IV	0	C	0	G	0	C	0
	JUV	0	o	C	C	0	o	0
7	I	0	C	C	G	0	c	G
	II	0	0	C	0	0	0	o
	III	0	0	G	0	0	C	0
	IV	0	c	C	0	0	c	0
	JUV	0	o	0	0	0	o	0
b	I		c	C	0	0	C	0
	11		C	0	0	0	o	0
	III		o	0	c	0	0	0
	IV		0	0	o	0	0	G
	JUV		0	0	c	0	0	o
9	I	1	510		o	0	c	0
	II	0	c		G	0	c	0
	111	0	o		1	0	0	0
	IV	0	0		0	0	0	0
	JUV	0	c		c	0	c	0
10	I	0		21	o	0		0
	II	0		16	0	0		0
	III	0		4	C	0		G
	Iv	0		0	o	0		o
	JUV	0		C	c	0		0

APPENDIX C

Density per 1000 cubic meters

1976-1977.

FISH EGGS/1000 CU M

STATION	SIZE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	<1 MM	0	0	0	2	0	0	0
	1 MM	0	1	0	1	0	0	0
	2 MM	1	1	2	0	0	0	0
	3 MM	0	51	91	0	0	0	0
2	<1 MM	0	1	0	7	0	0	0
	1 MM	0	0	30	118	0	0	0
	2 MM	0	2	3	1	0	0	0
	3 MM	0	0	1	0	0	0	0
3	<1 MM	0	0	0	2	0	0	0
	1 MM	13	123	485	0	0	0	0
	2 MM	0	16	14	1	0	0	0
	3 MM	0	0	0	0	0	0	0
4	<1 MM	0	0	0	5	0	0	0
	1 MM	0	0	6	0	0	0	0
	2 MM	0	0	1	0	0	0	0
	3 MM	0	0	0	0	0	0	0
5	<1 MM	0	0	2	1566	100	0	0
	1 MM	3	399	306	320	6	0	0
	2 MM	0	21	12	0	0	0	0
	3 MM	0	0	7	0	0	0	0
6	<1 MM	0		18	399	43	0	0
	1 MM	35	740:	3001	3	1	0	0
	2 MM	3	0	0	0	0	0	0
	3 MM	0	0	0	0	0	0	0
7	<1 MM	0	0	172	1451	0	0	0
	1 MM	252	275	4125	258	0	0	0
	2 MM	0	4	4	0	1	0	0
	3 MM	0	0	0	0	0	0	0
8	<1 MM		0	449	3526	0	0	0
	1 MM		2931	2224	215	0	0	0
	2 MM		31	3	0	0	0	0
	3 MM		0	0	0	0	0	0

CONTINUATION-FISHEGGS/1000 CU M

9	<1 MM	o	0		1	0	0	0
	1 MM	1	23		2	0	0	0
	2 MM	1	2		1	0	0	0
	3 MM	0	20		1	1	0	0
10	<1 MM	0		4	0	1		0
	1 MM	3		4	1	0		0
	2 MM	0		30	1	0		0
	3 MM	0		16	2	0		0

HIPPOGLOSSOIDES SP./1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	o	0	43	5	o	0	0
	JUV	0	0	0	0	0	0	0
2	LAR	0	0	1	7	1	0	0
	JUV	0	0	0	0	0	0	0
3	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
4	LAR	0	0	0	0	1	0	0
	Juv	0	0	0	u	0	0	0
5	LAR	0	0	13	4	0	0	0
	JUV	0	0	0	0	0	0	0
6	LAR	0	0	0	3	0	0	0
	JUV	0	0	0	0	0	0	0
7	LAR	0	0	0	238	0	0	0
	JUV	0	0	0	0	1	0	0
8	LAR		0	0	66	0	0	0
	JUV		0	0	Q	0	0	0
9	LAR	0	0		4	1	0	0
	JUV	0	0		0	0	0	0
10	LAR	0		0	11	0		0
	JUV	0		0	0	0		0

GADIDAE/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL u-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	o	15	4	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	LAR	0	24	4	0	0	0	0
	JUV	0	0	0	0	0	0	0

CONTINUATION-GADIDAE/1000 CU M

3	LAR	o	0	2	0	0	o	o
	JUV	0	0	0	0	0	0	0
4	LAR	0	1	0	0	0	0	0
	JUV	0	0	u	0	0	0	0
5	LAR	0	0	o	4	0	0	0
	JUV	0	0	0	o	3	0	0
6	LAR	0	0	0	0	0	0	0
	JUV	0	0	o	0	0	0	0
7	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	LAR		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	LAR	9	3		2	0	0	0
	JUV	0	0		0	0	0	0
10	LAR	0		0	0	0		0
	JUV	0		0	0	0		0

OSMERIDAE/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	0	0	0	501	404	1	0
	JUV	0	0	0	0	0	0	0
2	LAR	o	5	0	1904	195	0	42
	JUV	0	0	G	0	0	0	0
3	LAR	o	0	0	26	61	0	0
	JUV	0	0	0	0	o	0	1
4	LAR	o	0	0	586	0	0	0
	JUV	0	0	0	0	0	0	0
5	LAR	o	0	0	1315	746	0	2
	JUV	0	0	0	0	0	0	0
b	LAR	o	2	0	0	550	0	1
	JUV	0	0	0	0	0	0	0

CONTINUATION-OSMERIDAE /1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
7	LAR	o	0	0	254	17	6	2
	JUV	0	0	0	0	0	0	0
8	LAR		0	G	7	7	0	0
	JUV		0	0	0	0	0	0
9	LAR	o	0		103	42	1	2
	JUV	0	0		o	0	0	0
10	LAR	o		0	229	12		0
	JUV	0		0	0	0		0

MALLOTUS VILLOSUS/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	4	b	0	1670	143	10	0
	JUV	0	o	0	0	0	0	0
2	LAR	o	0	0	2110	121	13	0
	JUV	0	0	0	0	1	0	0
3	LAR	o	0	0	417	24	0	0
	JUV	0	0	o	0	0	0	0
4	LAR	o	0	0	687	2	0	0
	JUV	0	0	o	0	0	0	0
5	LAR	o	0	0	1999	907	0	2
	JUV	0	0	0	0	0	0	0
6	LAR	o	0	0	19	2766	2	0
	JUV	0	0	0	0	0	0	1
7	LAR	o	0	0	1495	44	0	0
	JUV	0	0	0	o	0	0	0
8	LAR		0	0	174	424	24	0
	JUV		0	0	0	0	0	0
9	LAR	5	0		85	42	0	0
	JUV	0	0		0	0	0	0
10	LAR	0		0	81	11		0
	JUV	o		0	o	0		0

CLUPEA HARENGUS PALLASI/1000 CUM

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
4	LAR	0	0	0	52	4	0	0
	JUV	0	0	0	0	0	2	0
5	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
6	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	LAR	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	LAR		0	0	22	0	0	0
	JUV		0	0	0	0	0	0
9	LAR	0	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	LAR	0		0	0	0		0
	JUV	0		0	0	0		0

AMMODYTES HEXAPTERUS/1000 CUM

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	LAR	4	0	8	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	LAR	0	4	76	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	LAR	16	43	6	0	0	0	37
	JUV	0	0	0	0	0	0	0

CONIINUATIUN-AMMODYTES HEXAPTERUS/1000 CU M

4	LAR	o	2	12	0	0	0	0
	JUV	0	0	0	0	o	0	0
5	LAR	1	1296	344	0	0	0	lb
	JUV	0	0	0	0	0	o	o
b	LAR	17	525	1	0	0	0	31
	JUV	0	0	0	0	0	0	0
7	LAk	22	2	68	0	0	0	0
	JUV	0	0	0	0	0	0	0
b	LAR		145	29	0	0	0	0
	JUV		0	0	0	0	0	0
9	LAR	1	1		0	0	0	0
	JUV	0	0		0	0	0	0
10	LAR	1		0	0	0		o
	JUV	0		0	0	0		0

ANOMURA/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	ZOE	10	203	417	356	524	0	0
	MEG	0	0	0	0	19	0	0
2	ZOE	0	375	8408	602	189	26	0
	MEG	0	0	0	55	20	0	0
3	ZOE	0	0	44	811	4	0	18
	MEG	0	0	0	0	9	2	0
4	ZOE	0	1	2	25	8	0	0
	MEG	0	0	0	2	4	0	0
5	ZOE	0	3805	1726	3871	3699	21	2
	MEG	0	0	0	0	10	22	0
6	ZOE	3a	330	b	326	609	0	71
	MEG	0	0	0	13	8	0	0
7	ZOE	0	95	577	2751	33	3	0
	MEG	0	0	0	0	7	3	0
8	ZOE		146	2980	69	653	2	0
	MEG		0	0	0	30	2	0
9	ZOE	0	66		273	21	0	0
	MEG	0	0		12	1	0	0
10	ZOE	0		20	12	0		0
	MEG	0		0	0	0		0

BRACHYURA/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	ZOE	0	161	1409	811	32	0	0
	MEG	0	0	G	244	4	0	0
2	ZOE	0	623	9418	1340	330	0	0
	MEG	0	0	0	322	48	0	0

CONTINUATION-BRACHYURA/1000 CU M

3	ZOE	o	5 4	1776	931	152	0	1
	MEG	0	0	0	78	10	0	0
4	ZOE	0	0	207	26	221	0	0
	MEG	0	0	0	1	1	0	o
5	ZOE	0	1144	7855	5462	3526	2	0
	MEG	0	0	0	165	29	0	0
6	ZOE	0	1508	6266	833	791	0	409
	MEG	0	0	0	0	20	0	0
7	ZOE	o	92	710	12226	19	b	0
	MEG	o	0	o	343	1	o	0
8	ZOE		27	11332	95	1219	0	0
	MEG		0	0	10	30	0	0
9	ZOE	0	93		655	4	0	1
	MEG	0	0		777	1	0	0
10	ZOE	o		125	27	2		0
	MEG	0		0	98	1		0

CANCER MAGISTER/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	0	0	0	0	0
	II	0	0	0	0	1	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	1	1	0
	MEG	0	0	0	0	1	37	0
2	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	2	0	0
	MEG	0	0	0	0	0	0	0
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
5	I	0	0	0	0	0	0	0
	II	0	0	0	12	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	4	0	0
6	I	0	0	0	3	0	0	0
	II	0	0	0	0	2	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
7	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0

CONTINUATION-CANCER MAGISTER/1000 CU M

b	I		0	0	0	0	0	0
	II		0	0	0	0	0	0
	III		0	0	0	7	0	0
	IV		0	0	0	cl	0	0
	V		0	0	0	0	0	0
	MEG		0	0	0	5	0	0
9	I	0	0		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	V	0	0		0	0	0	0
	MEG	0	0		0	1	0	0
10	I	0		G	0	0		0
	II	0		0	0	0		0
	III	0		0	0	0		0
	IV	0		0	0	0		0
	V	0		0	0	0		0
	MEG	0		0	0	0		0

CANCER SPP./1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	5	7	2075	0	0	0
	II	0	0	0	729	0	0	0
	III	0	0	0	60	23	0	0
	IV	0	0	0	2	55	0	0
	V	0	0	0	0	75	0	0
	MEG	0	0	0	0	12	0	0
2	I	0	1	0	956	6	0	0
	II	0	0	0	1230	16	0	0
	III	0	0	0	73	240	0	0
	IV	0	0	0	0	1137	0	0
	V	0	0	0	0	455	0	0
	MEG	0	0	0	0	39	20	0

CONTINUATION-CANCER SPP./1000 CU M

3	I	0	0	0	7742	2	0	1
	II	0	0	0	1063	3	0	0
	III	0	0	0	45	26	0	0
	IV	0	0	0	0	76	0	0
	V	0	0	0	0	52	0	0
	MEG	0	0	0	0	2	0	0
	I	0	0	0	17	0	0	0
	II	0	0	0	0	3	0	0
	III	0	0	0	0	7	0	0
	IV	0	0	0	0	43	0	0
	V	0	0	0	0	7	0	0
	MEG	0	0	0	0	1	0	0
	I	0	0	0	22779	5	0	0
	II	0	0	0	1281	5	0	0
	III	0	0	0	9	115	0	0
	IV	1	0	0	0	1128	0	0
	V	0	0	0	0	376	0	0
	MEG	0	0	0	0	145	23	0
b	I	0	0	0	183	7	0	58
	II	0	0	0	12	13	0	0
	III	0	0	0	0	121	0	0
	IV	0	0	0	0	370	0	0
	V	0	0	0	0	260	0	0
	MEG	0	0	0	0	96	0	0
	I	0	0	0	20	0	0	0
	II	0	0	0	1	5	0	0
	III	0	0	0	0	21	0	0
	IV	0	0	0	0	32	0	0
	V	0	0	0	0	14	0	0
	MEG	0	0	0	0	1	37	0
	I		0	0	0	0	0	0
	II		0	0	0	0	0	0
	III		0	0	0	235	0	0
	IV		0	0	0	1454	0	0
	V		0	0	0	848	0	0
	MEG		0	0	0	7	6	0
	I	0	0		82	0	0	0
	II	0	0		44	0	0	0
	III	0	0		79	6	0	0
	IV	0	0		0	30	0	0
	V	0	0		0	157	1	0
	MEG	0	0		0	61	0	0

CONTINUATION-CANCER SPP./1000 CU M

10	I	0		0	1	0		0
	II	0		0	61	0		0
	III	0		0	26	1		0
	IV	0		0	1	2		0
	V	0		0	0	10		0
	MEG	0		0	0	2		0

CHIONOECETES BAIRDI/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 6-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	1	22	2	0	0	0
	II	0	0	0	141	0	0	0
	MEG	0	1	9	0	2	1	0
2	I	0	0	945	0	0	0	0
	II	0	0	0	3	0	0	0
	MEG	0	18	0	0	11	0	0
3	I	0	1	17	4	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	2	0	0	2	0	0
4	I	0	1	0	3	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	0	1	0	0	0	0
5	I	0	3053	2094	0	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
6	I	0	0	466	0	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	0	0	0	2	0	0
7	I	0	0	51	0	0	0	0
	II	0	0	0	0	0	0	0
	MEG	0	2	0	0	0	0	0
8	I		0	68	0	0	0	0
	II		0	0	0	0	0	0
	MEG		2	5	0	0	0	0

CCNTINUATICN-CHICNCECETES BAIRDI/1000 CU M

9	I	0	0		0	0	0	0
	II	0	0		0	G	0	0
	MEG	1	2		0	1	C	0
10	I	0		45	0	0		0
	II	0		0	5	0		0
	MEG	1		5	C	0		0

PARALITHODES CAMI SCHATICA/1000 CU M

STATION	STAGE	Ark 6-13	MAY 6-9	MAY 22-30	JUL 6-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	6	0	o	0	0
	II	0	0	5	0	0	0	0
	III	0	0	4	0	0	0	0
	IV	0	0	U	0	0	0	0
	MEG	0	0	0	0	o	0	0
	I	0	0	5	o	0	"C	0
	II	0	0	74	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	C	0
	MEG	0	0	0	3	0	0	0
	I	0	3	0	0	o	C	0
	II	0	0	0	0	0	0	0
	III	0	0	C	0	0	0	0
	IV	0	0	0	0	0	C	0
	MEG	0	0	0	8	G	0	0
	I	0	0	0	0	o	C	0
	II	0	0	0	u	0	0	0
	III	0	0	0	o	0	0	0
	IV	0	0	0	0	0	C	c
	MEG	0	0	0	0	0	0	o
	I	0	2183	0	0	0	0	25
	II	0	1287	339	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	C	C	0	0	0

CONTINUATION-PARALITHODES CAMTSCHATICA/1000 CU M

6	I	2	345	0	0	0	0	5
	II	1	190	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	0	0	0	0
7	I	0	1240	102	0	0	0	0
	II	0	4	1282	0	0	0	0
	III	0	0	140	0	0	0	0
	IV	0	0	0	0	0	0	0
	MEG	0	0	0	1	0	0	0
8	I		1129	0	0	0	0	0
	II		20	266	0	0	0	0
	III		0	326	0	0	0	0
	IV		0	0	0	0	0	0
	MEG		0	0	0	0	0	0
9	I	0	30		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	MEG	0	0		0	0	0	0
10	I	0		0	0	0		0
	II	0		0	0	0		0
	III	0		0	0	0		0
	IV	0		0	0	0		0
	MEG	0		0	0	0		0

PANDALOPSIS DISPAR/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	0	0	0	0	0
	II	0	0	1	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	1	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	4	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
5	I	0	0	0	0	0	0	21
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
6	I	1	0	0	0	0	0	0
	II	0	3	0	0	0	0	0
	III	0	0	0	0	1	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0

CONTINUATION-PANDALOPSIS DISPAR/1000 CU M

7	I	o	0	G	0	o	o	o
	II	0	0	0	0	0	0	0
	III	0	0	0	o	0	0	0
	IV	0	0	G	0	0	0	0
	V	0	0	o	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	I		0	0	0	0	0	0
	II		0	o	0	0	0	0
	III		0	0	0	0	o	0
	IV		0	0	0	0	0	0
	V		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	1	0		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		1	0	0	0
	IV	0	0		0	1	0	0
	V	0	0		o	0	0	0
	JUV	0	0		0	0	0	0
10	I	0		1	0	0		0
	II	0		0	0	0		0
	III	0		1	0	0		0
	IV	0		0	0	0		0
	V	0		0	0	0		0
	JUV	0		0	0	0		0

PANDALUS BOREALIS/1000 CU M

STATION	STAGE	APR 6-13	HAY 6-9	HAY 22-30	JUL 0-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	o	20	0	0	0	0	0
	II	0	14	10	o	0	0	0
	III	0	0	52	0	0	0	0
	IV	0	0	2	1	0	0	0
	V	0	0	0	1	1	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	3	0	0

PANDALUS DANAE/1000 Cu M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-24
1	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	1	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	2	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0

CONTINUATION-PANDALUS DANAE/1000 CU M

b	1	o	0	0	0	0	0	0
	II	0	0	0	o	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	o	0	0	0
	v	0	0	o	0	0	0	0
	VA	0	0	0	0	0	0	0
	JUV	0	0	G	0	0	0	0
7	I	0	0	o	0	0	0	0
	II	0	0	0	5	0	0	0
	III	0	0	0	0	0	0	0
	Iv	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	I		0	0	0	0	0	0
	11		0	0	0	0	0	0
	III		0	0	0	0	0	0
	Iv		0	o	0	0	0	0
	v		0	0	0	0	0	0
	VI		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	0	0		0	0	0	0
	II	0	0		0	0	0	0
	111	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	V	0	0		0	0	0	0
	VI	0	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	1	0		0	0	0		0
	II	0		0	0	0		0
	III	0		0	0	0		0
	Iv	0		0	0	0		0
	v	0		0	0	0		0
	VI	0		0	0	0		0
	JUV	0		0	0	0		0

PANDALUS GONIURUS/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	cl	0	0	0	0
	II	0	0	1	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	1	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	I	0	2	Al	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
4	I	0	1	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
5	I	0	4583	93	0	0	0	0
	II	0	687	2612	0	0	0	0
	III	0	0	1480	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	VII	0	0	0	0	0	0	0
	Juv	0	0	0	0	0	0	0

CONTINUATION-PANDALUS GONIURUS/1000 CU M

6	1	1	2812	10	0	0	0	0
	11	0	0	10	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	6	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	o	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	2	0	0	0
7	1	o	251	1942	0	0	0	0
	II	0	0	10182	0	0	0	0
	III	0	0	894	0	0	0	0
	xv	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VI	0	0	0	o	0	0	0
	VII	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
	I		2730	2	o	0	0	0
	II		46	85	0	0	0	0
	III		0	17	0	0	0	0
	Iv		0	0	0	0	0	0
	V		0	0	0	0	0	0
	VI		0	0	0	0	0	0
	VII		0	0	0	0	0	0
	JUV		0	0	o	0	0	0
9	I	o	29		0	0	0	0
	11	0	0		0	0	0	0
	III	0	0		0	0	0	o
	IV	0	0		0	0	0	0
	v	0	0		0	0	0	0
	VI	0	0		0	0	0	0
	VII	0	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	1	o		0	0	0		0
	II	0		1	0	0		0
	III	0		0	0	0		0
	Iv	0		0	0	0		0
	V	0		0	0	0		0
	VI	0		0	0	0		0
	VII	0		0	0	0		0
	JUV	0		0	0	0		0

PANDALUS HYPSINOTUS/ 1000 CU M

STATION	STAGE	APR 6-13	HAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	I	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VI	0	0	o	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	o	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	111	0	0	0	0	0	0	0
	I v	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VA	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
5	I	0	5	6	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	u	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0

CONTINUATION-PANDALUS HYPSINOTUS/1000 CU M

6	I	0	2	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	I		0	0	0	0	0	0
	II		0	0	0	0	0	0
	III		0	0	0	0	0	0
	IV		0	0	0	0	0	0
	V		0	0	0	0	0	0
	VI		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	0	0		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		0	0	0	0
	V	0	0		0	0	0	0
	VI	0	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	I	0		0	0	0		0
	II	0		0	0	0		0
	III	0		0	0	0		0
	IV	0		0	0	0		0
	V	0		0	0	0		0
	VI	0		0	0	0		0
	JUV	0		0	0	0		0

PANDALUS PLATYCERUS/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
2	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	2
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
5	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
6	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0

LONILNUATI ON-PANUALUS PLATYCEROS/1000 CU M

8	I		0	0	0	0	0	0
	II		0	0	0	0	0	0
	III		0	G	o	0	0	0
	IV		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	o	0		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		0	0	0	0
	IV	o	0		0	0	0	0
	JUV	o	0		0	0	0	0
10	I	o		0	0	0		0
	II	0		G	o	0		0
	III	0		0	0	0		0
	Iv	o		0	0	0		0
	JUV	o		0	0	0		0

PANDALUS STENOLEPIS/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 8-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	o	5	b	1	0	0	0
	II	0	0	3	3	0	0	0
	III	0	0	0	6	0	0	0
	IV	0	0	0	5	0	0	0
	V	0	0	0	1	0	0	0
	VI	0	0	0	1	0	0	0
	JUV	0	0	0	0	0	0	0
2	1	0	2	0	0	o	0	0
	II	0	0	1	0	0	0	0
	111	0	0	1	0	o	0	0
	IV	o	0	0	0	0	0	0
	v	o	0	0	0	0	0	0
	VI	o	0	0	0	0	0	0
	JUV	o	0	0	0	0	0	0
3	I	o	0	0	0	0	0	0
	II	0	0	0	0	o	0	0
	III	0	0	0	0	0	0	0
	Iv	0	o	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VI	0	0	0	0	o	0	0
	JUV	o	0	0	o	0	0	0

CONTINUATION-PANDALUS STENOLEPIS/1000 CU M

4	I	o	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	111	0	0	o	0	0	0	0
	Iv	0	0	0	0	0	0	0
	v	0	0	o	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
5	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
b	1	0	0	o	0	0	0	0
	11	0	0	0	0	0	0	0
	III	0	0	0	3	0	0	0
	IV	0	o	0	0	0	0	0
	v	0	0	0	0	0	0	0
	vi	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	Iv	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0
	VI	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	I		0	0	0	0	0	0
	II		0	0	1	0	0	0
	III		0	0	o	0	0	0
	Iv		0	0	0	0	0	0
	v		0	o	0	0	0	0
	VI		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	0	28		6	0	0	0
	II	0	1		0	0	0	0
	III	0	0		0	0	0	0
	IV	0	0		1	0	0	0
	V	0	0		0	0	0	0
	VI	0	0		0	1	0	0
	JUV	0	0		0	0	0	0

CUNIINUA IIUN-PANDALUS STENDLEPIS/1000 CU M

10	I	o	G	0	0
	II	o	0	0	0
	111	0	0	1	0
	IV	o	0	1	0
	v	0	o	L	0
	VI	0	0	0	1
	JUV	o	0	0	0

PANDALUS MONTAGUI TRIDENS/1000 CU M

STATION	STAGE	APR 6-13	MAY 6-9	MAY 22-30	JUL 6-15	AUG 24-31	OCT 17-29	FEB 21-26
1	I	0	90	7	0	0	0	0
	II	0	0	72	0	0	0	0
	111	0	0	5	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	o	0
2	I	0	1	o	0	0	0	0
	II	0	0	1	o	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
3	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	Iv	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	o	o
4	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
5	I	0	5	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	o	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0

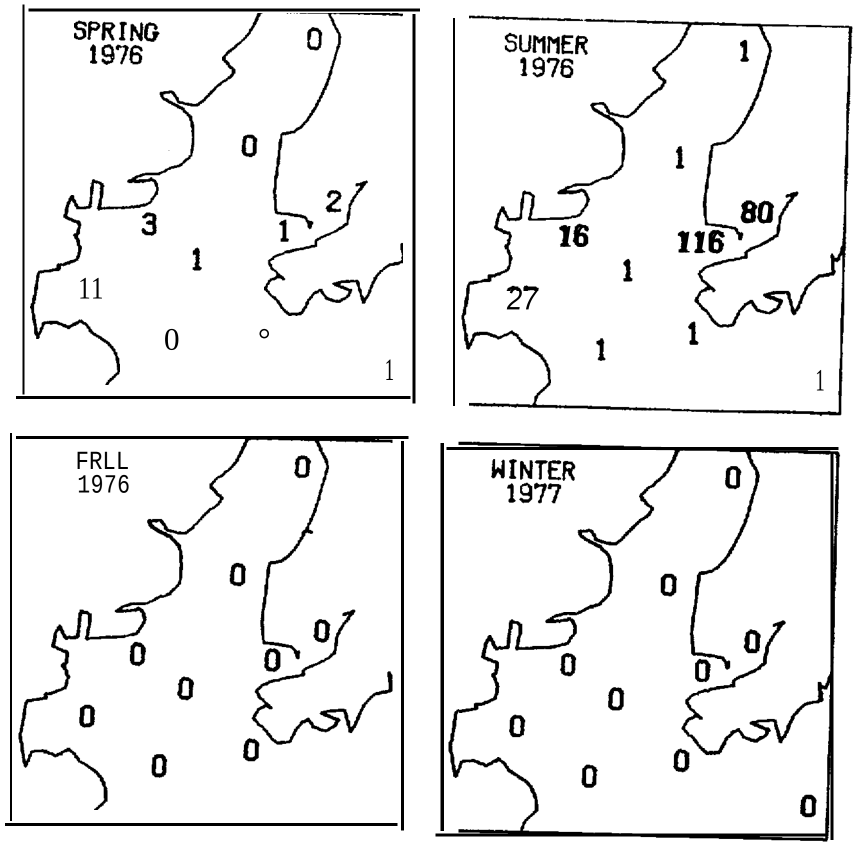
CONTINUATION-PANDALUS MONTAGUI TRIDENS/10 00 CU M

6	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
7	I	0	0	0	0	0	0	0
	II	0	0	0	0	0	0	0
	III	0	0	0	0	0	0	0
	IV	0	0	0	0	0	0	0
	JUV	0	0	0	0	0	0	0
8	I		0	0	0	0	0	0
	II		0	0	0	0	0	0
	III		0	0	0	0	0	0
	IV		0	0	0	0	0	0
	JUV		0	0	0	0	0	0
9	I	1	393		0	0	0	0
	II	0	0		0	0	0	0
	III	0	0		1	0	0	0
	IV	0	0		0	0	0	0
	JUV	0	0		0	0	0	0
10	I	0		24	0	0		0
	II	0		20	0	0		0
	III	0		4	0	0		0
	IV	0		0	0	0		0
	JUV	0		0	0	0		0

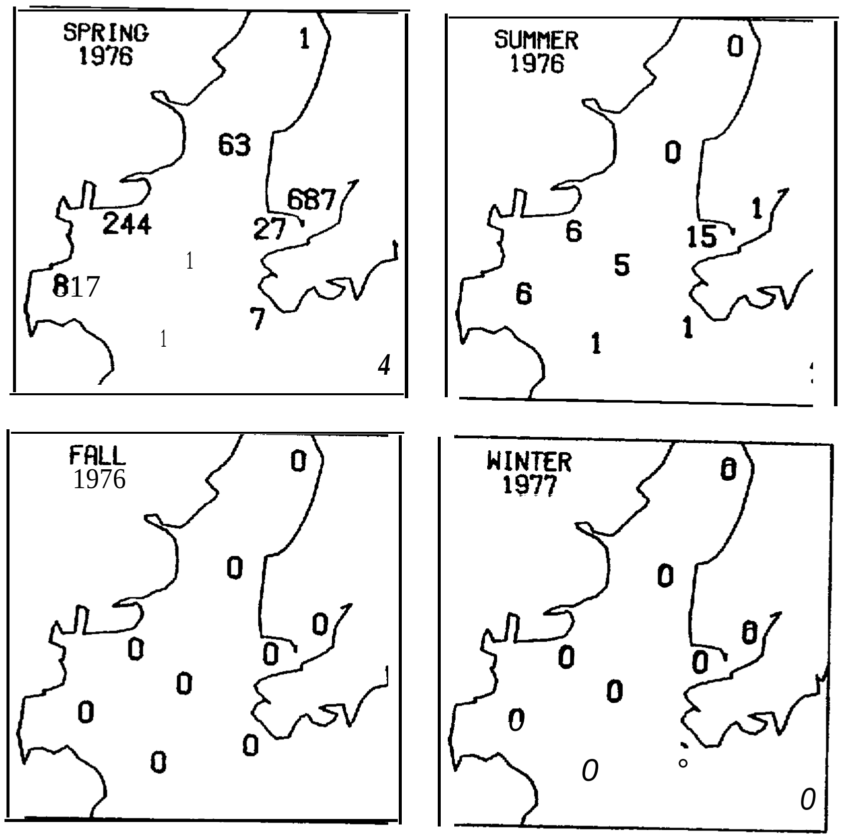
APPENDIX D

Density distributions per 10 square meters for four seasons. 1976-1977.

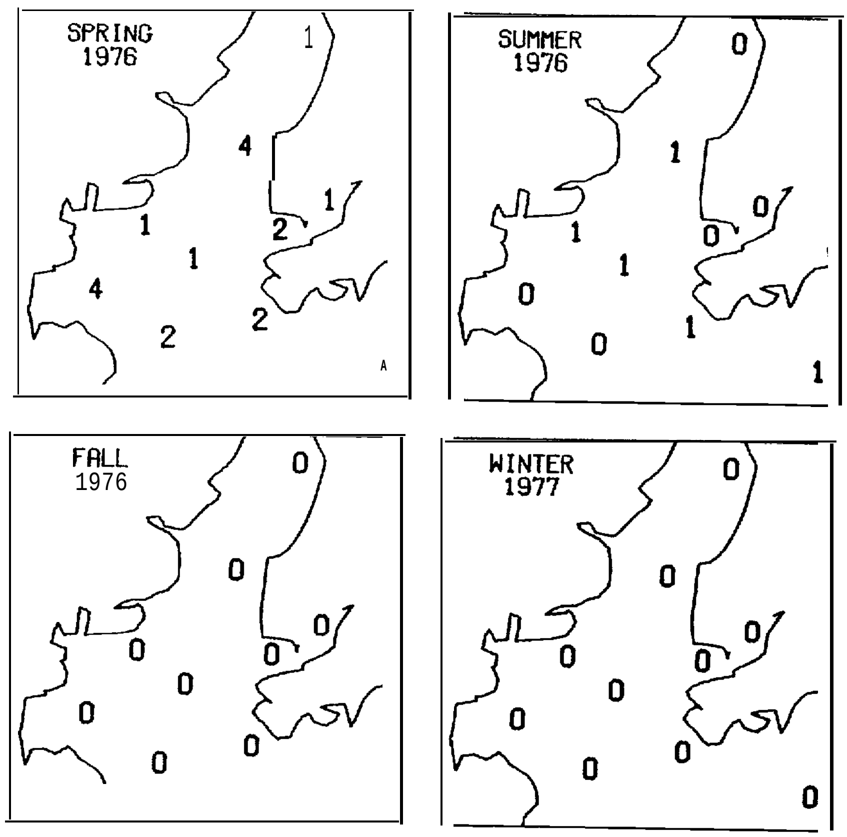
FISH EGGS
<1MM DIAM/10 SQ M



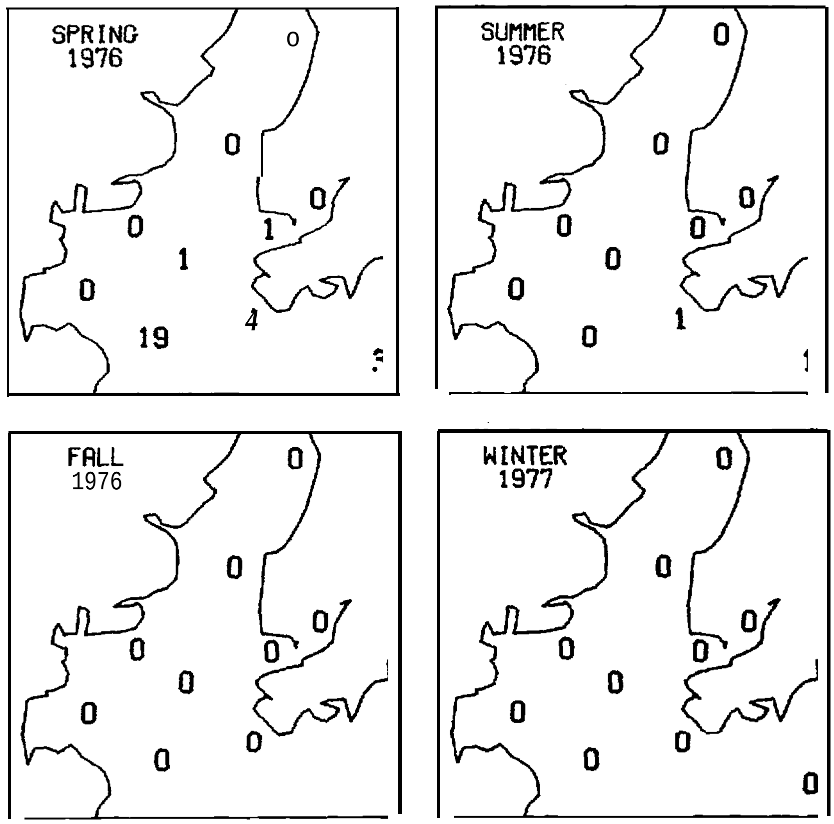
FISH EGGS
~ 1MM DIAM/10 SQ M



FISH EGGS
~2MM DIAM/10 SQ M

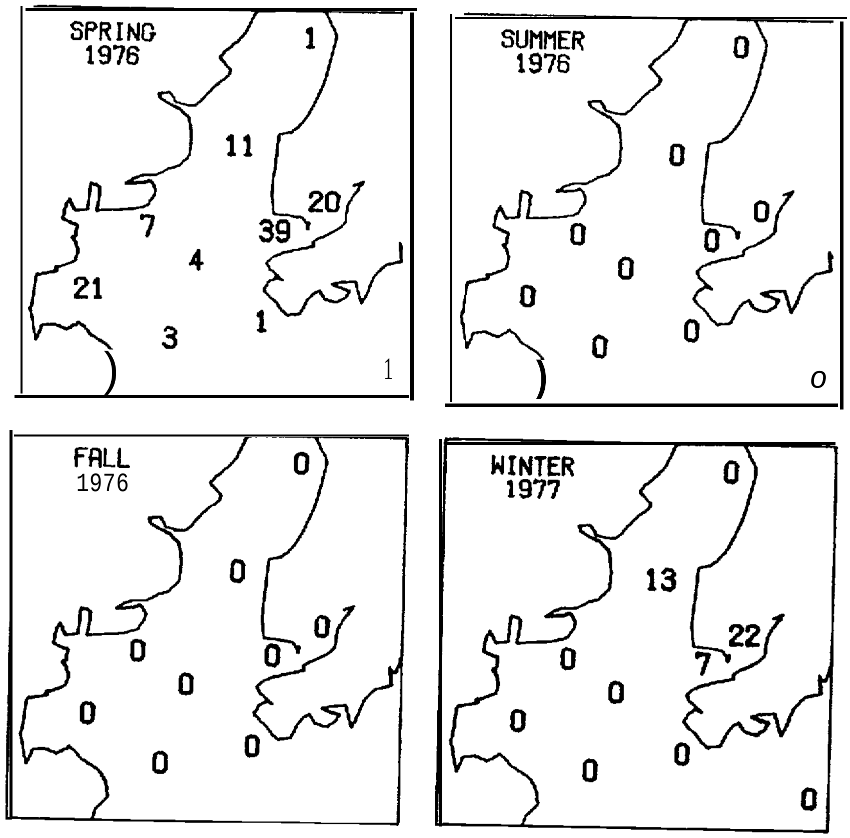


FISH EGGS
~3MM DIAM/10 SQ M

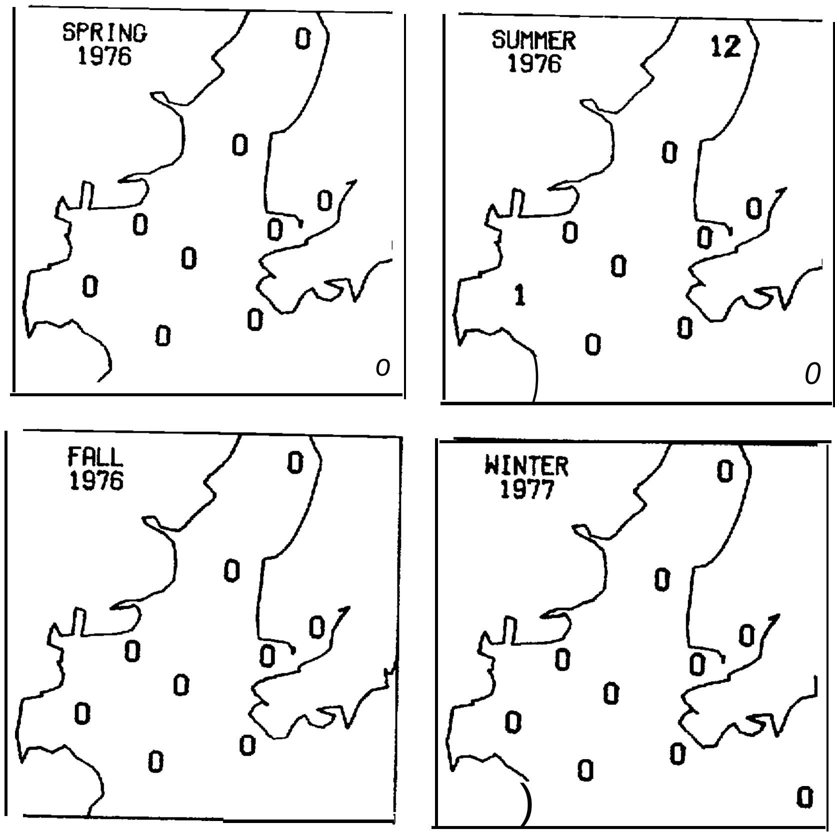


AMMODYTES HEXAPTERUS

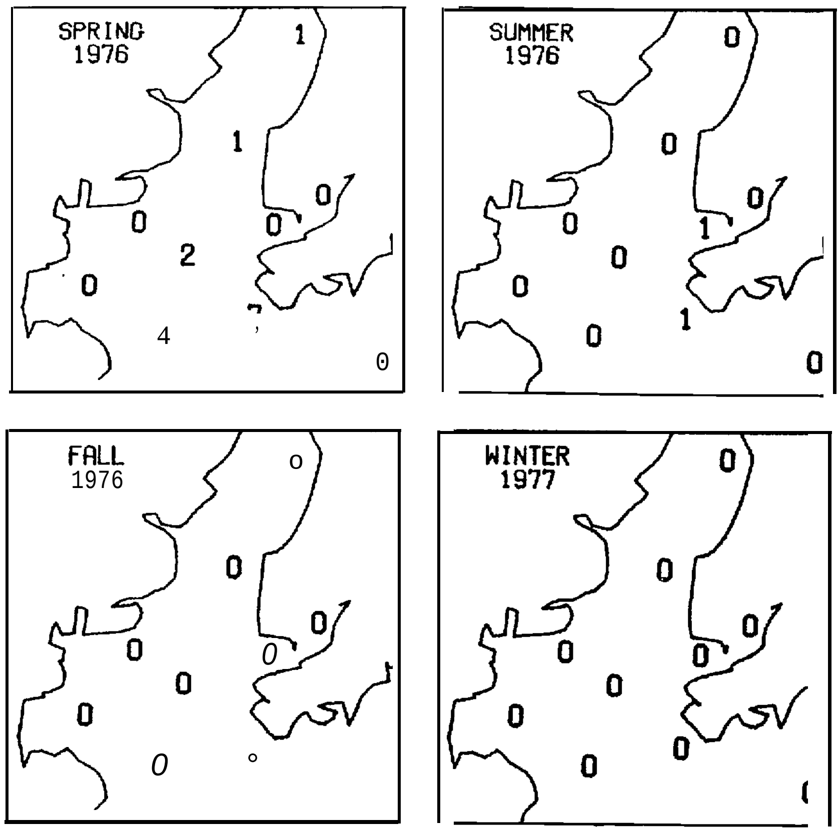
LARVA/10 SQ M



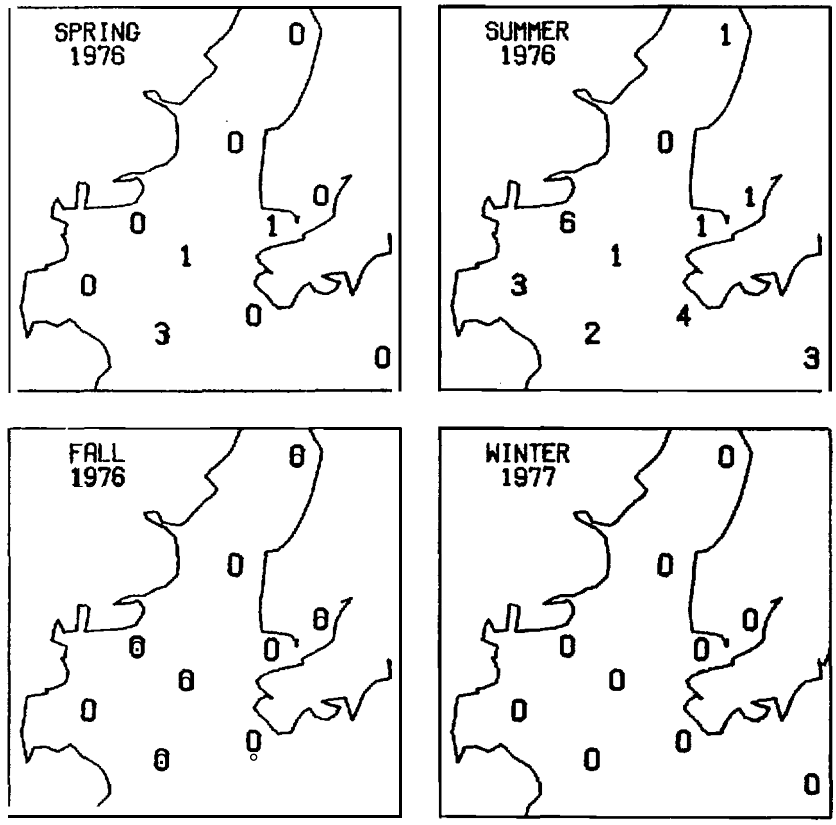
CLUPEA HARENGUS PALLASI
LARVA/10 SQ M



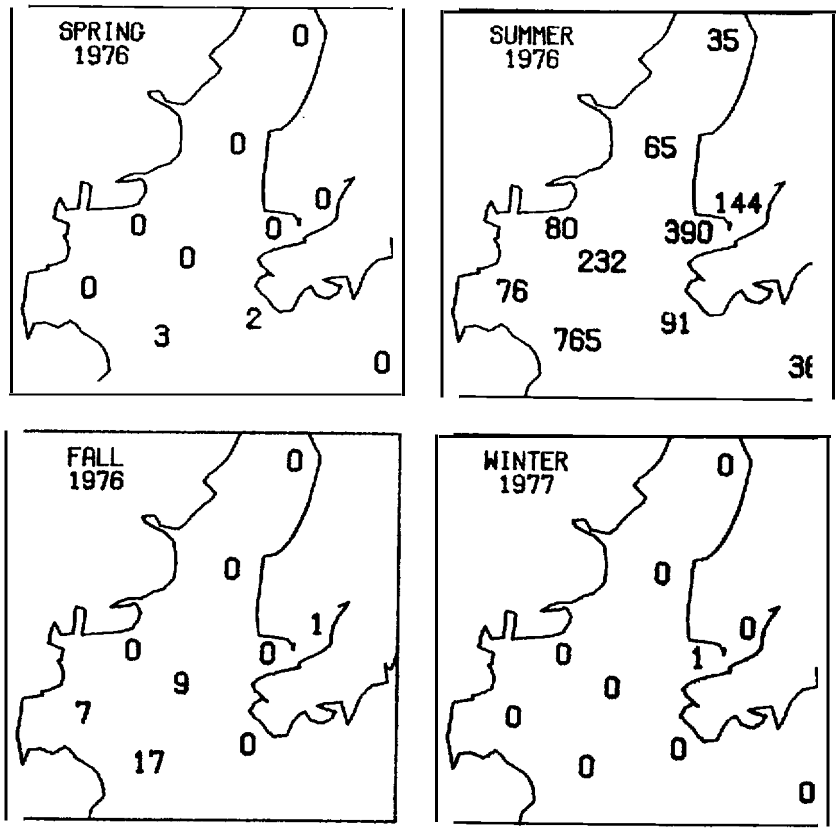
GADIDAE
LARVA/10 SQ M



HIPPOGLOSSOIDES SP.
LARVA/10 SQ M

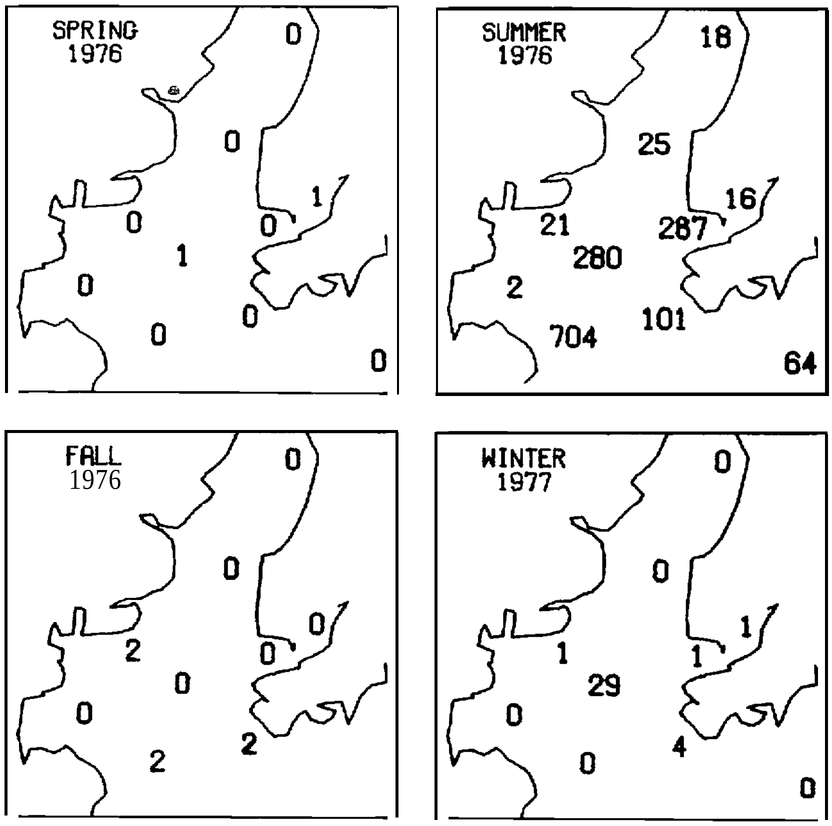


MALLOTUS VILLOSUS
LARVA/10 SQ M

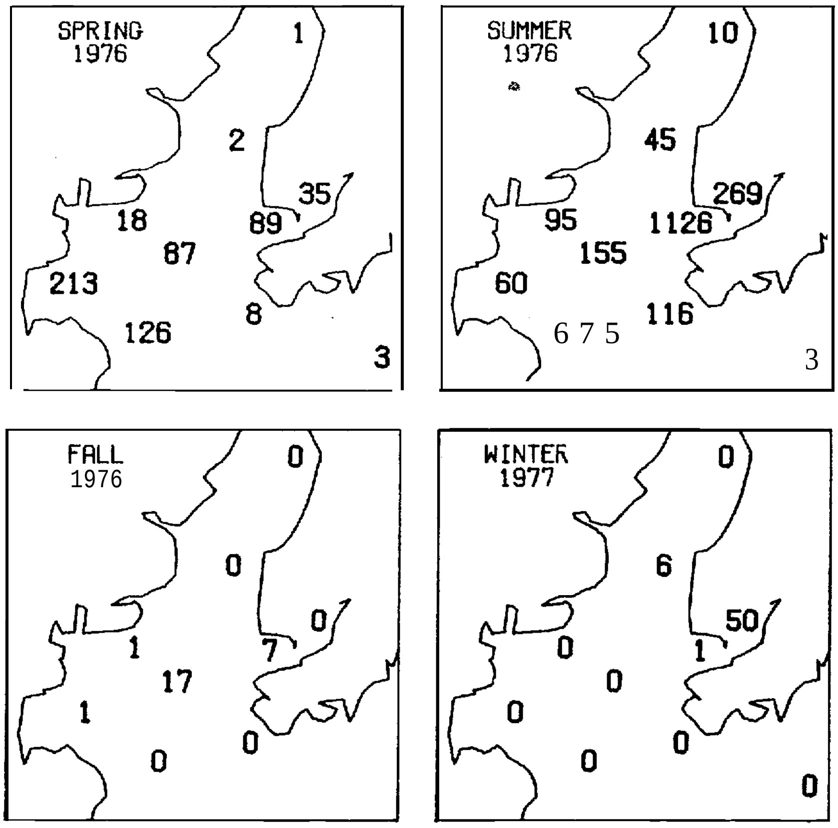


OSMERIDAE

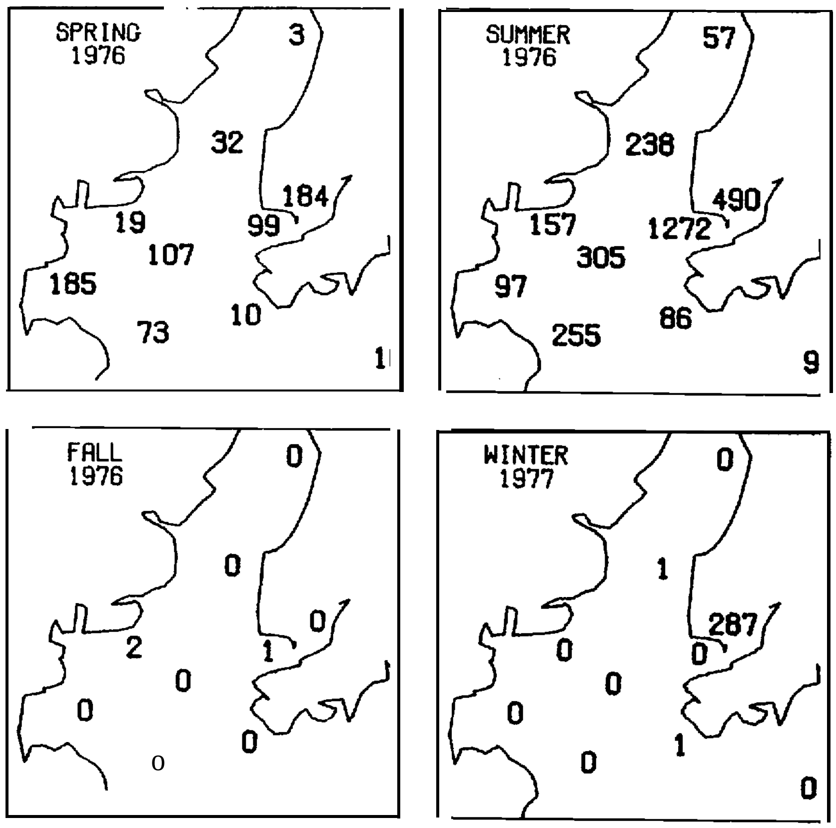
LARVA/10 SQ M



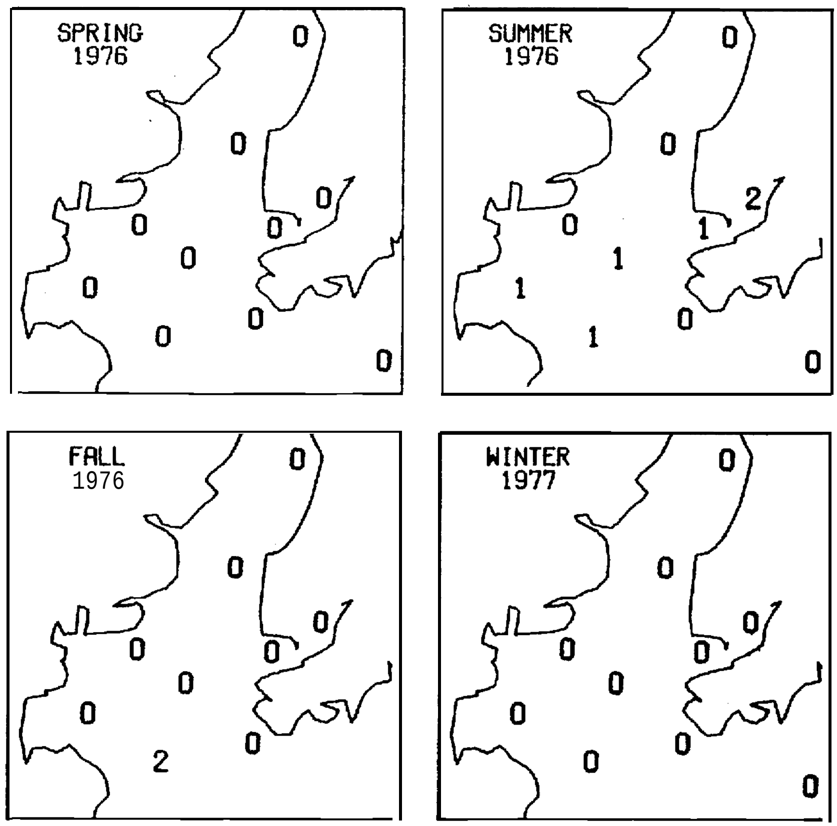
ANOMURA
ZOEA/10 SQ M



BRACHYURA
ZOEA/10 SQ M

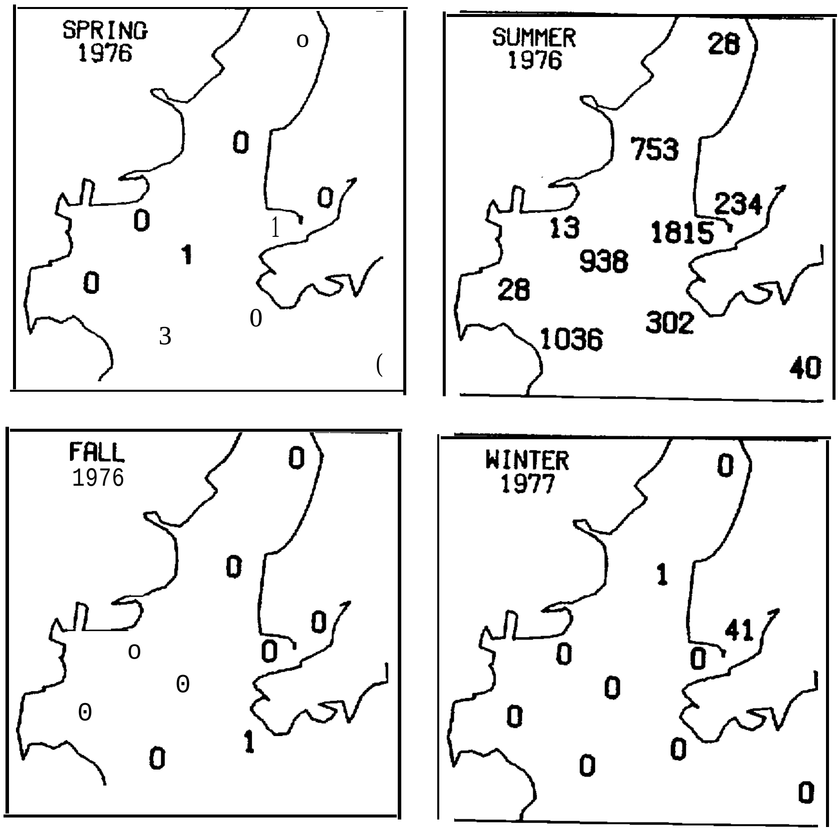


CANCER MAGISTER
ZOEA/10 SQ M

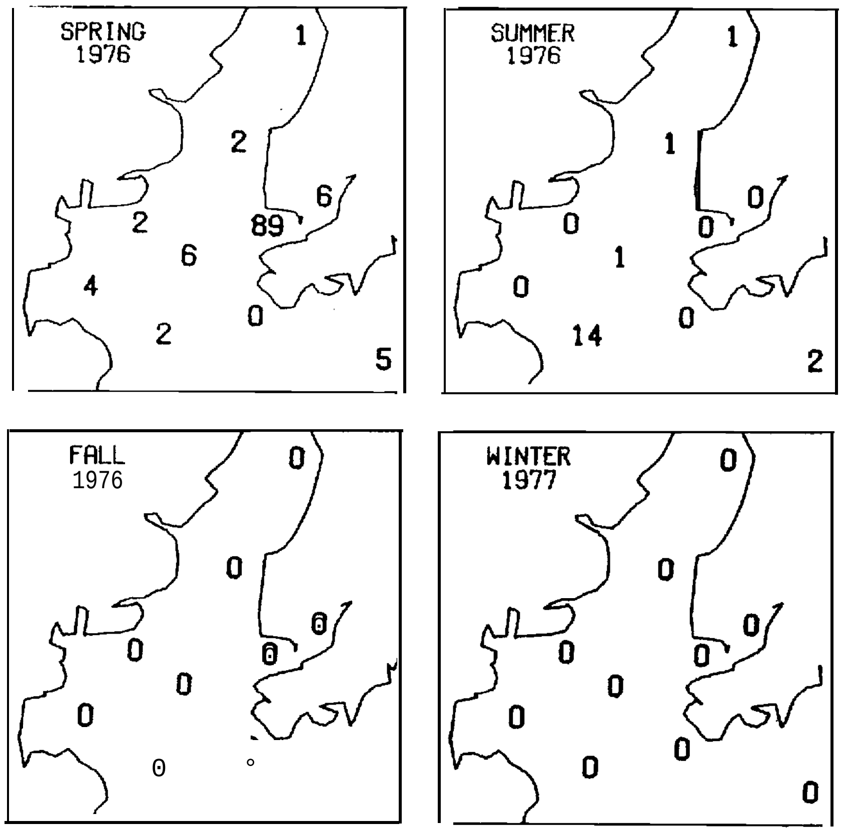


CANCER SPP

Z(3EW1O SQ M

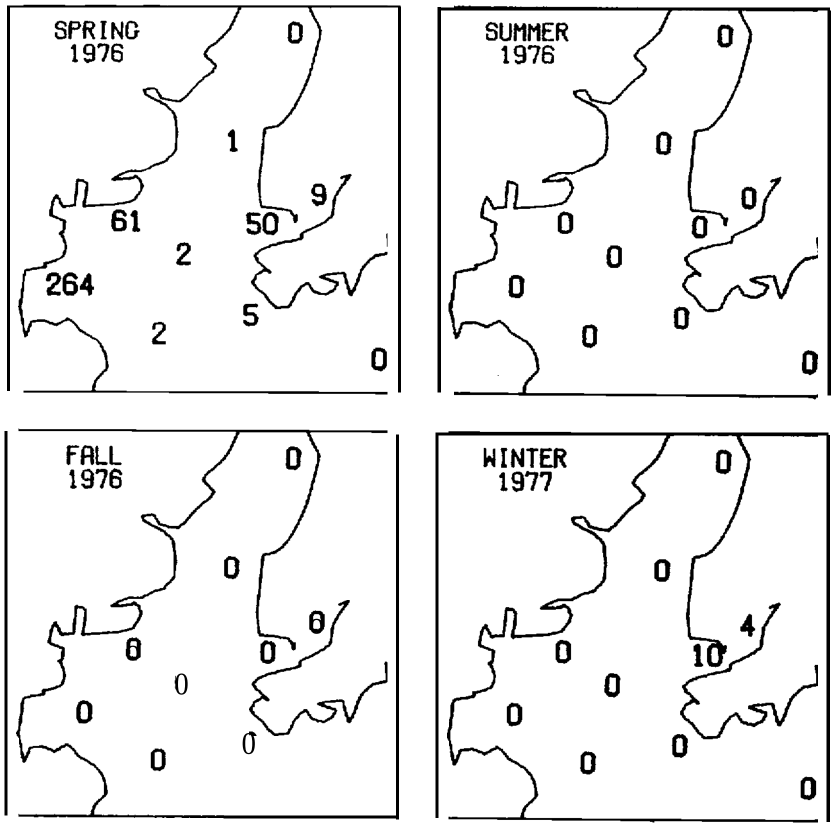


CHIONOECETES BAIRDI
ZOEA/10 SQ M

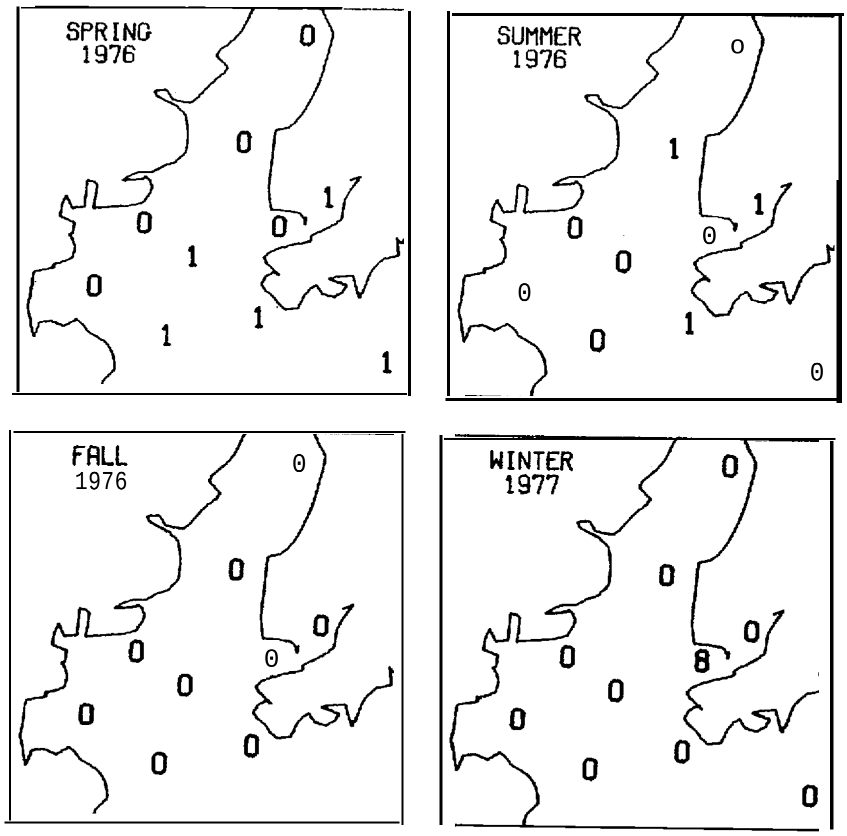


PARALITHODES CAMTSCHATICA

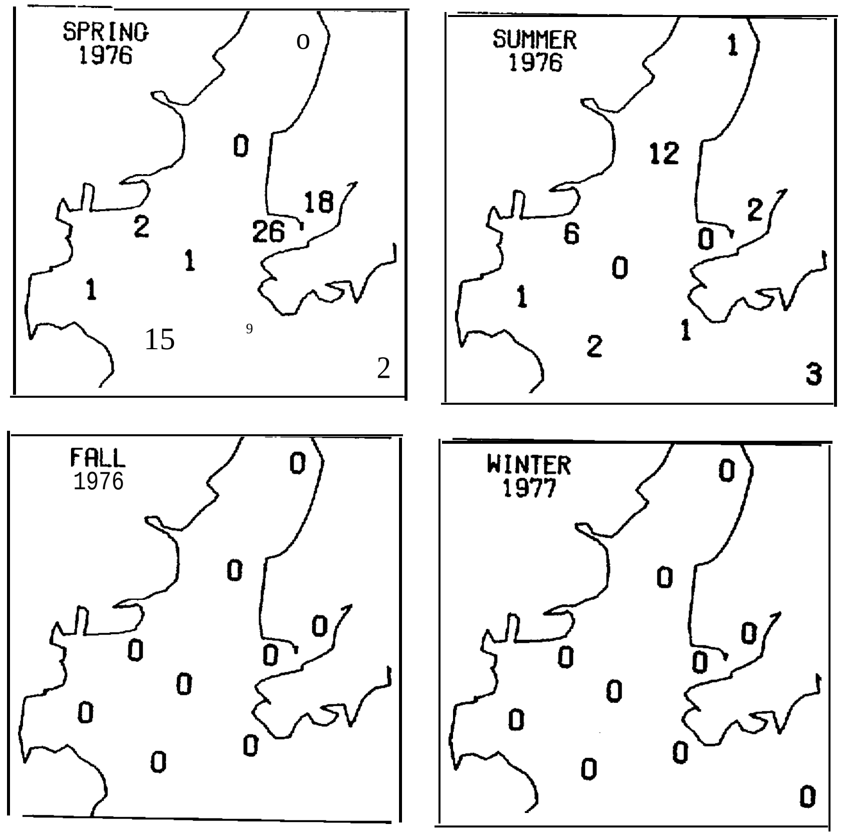
Z(3EFV1O SQ M



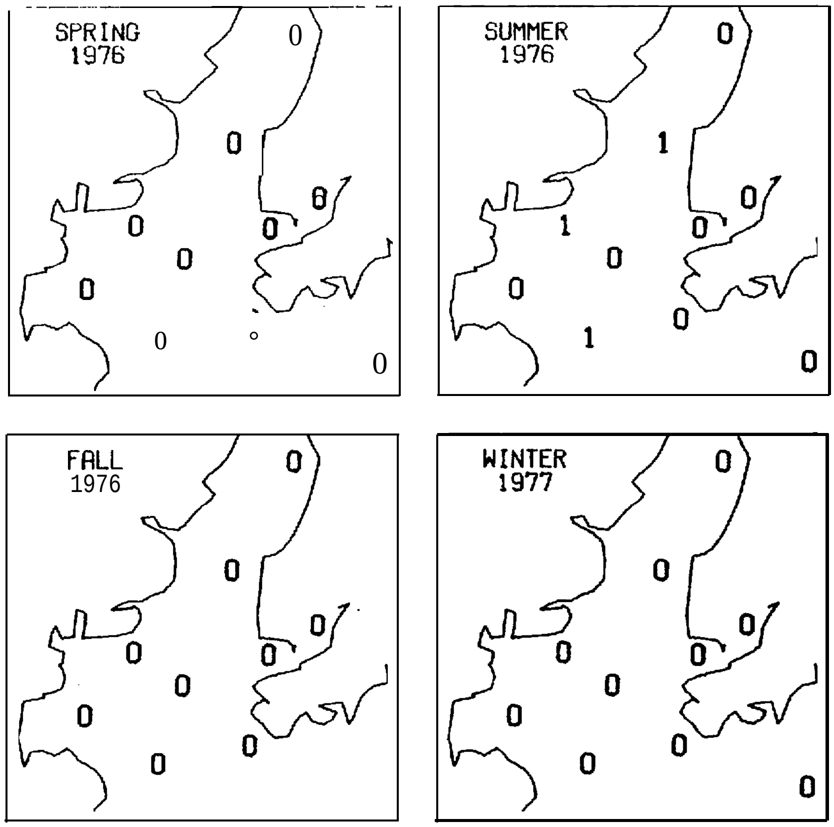
PANDALOPSIS DISPAR
ZOEA/10 SQ M



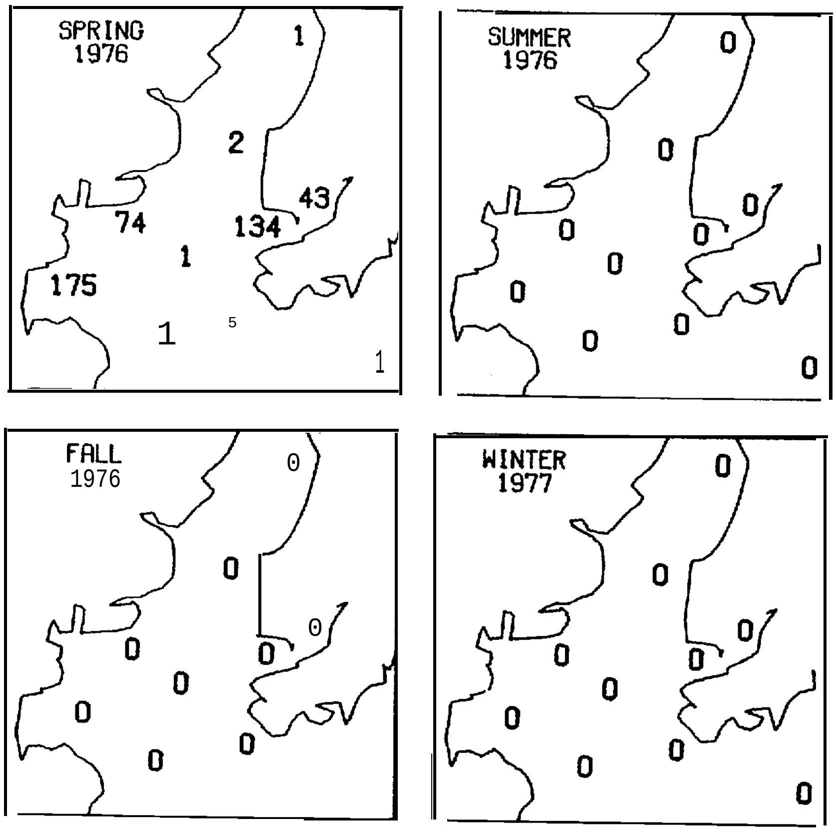
PANDALUS BOREALIS
ZOEA/10 SQ M



PANDALUS DANAE
ZOEA/10 SQ M

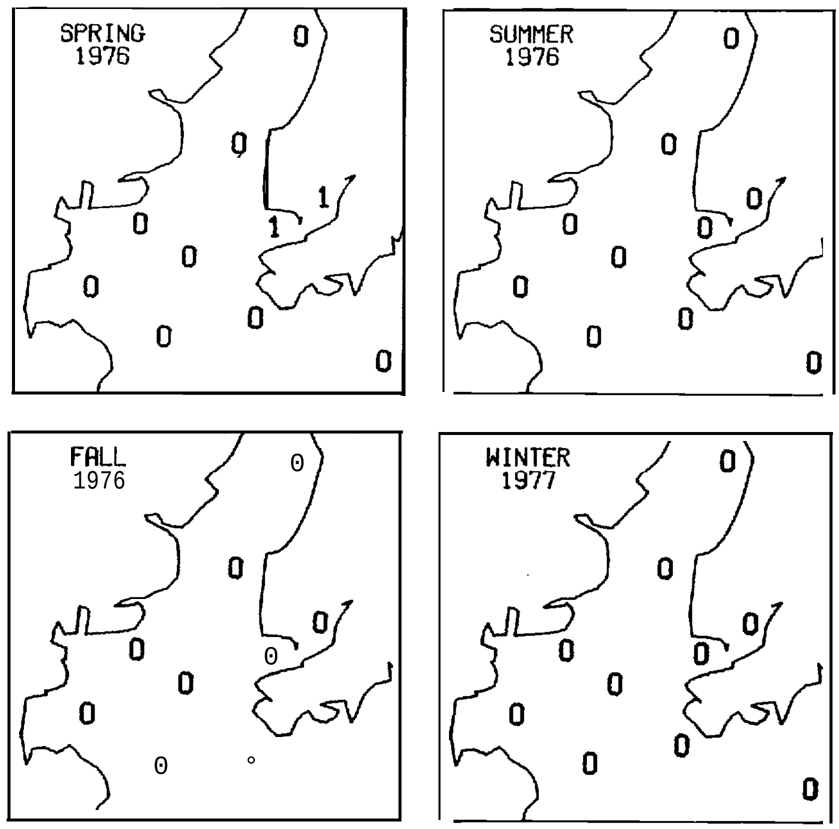


PANDALUS GONIURUS
ZOEA/10 SQ M

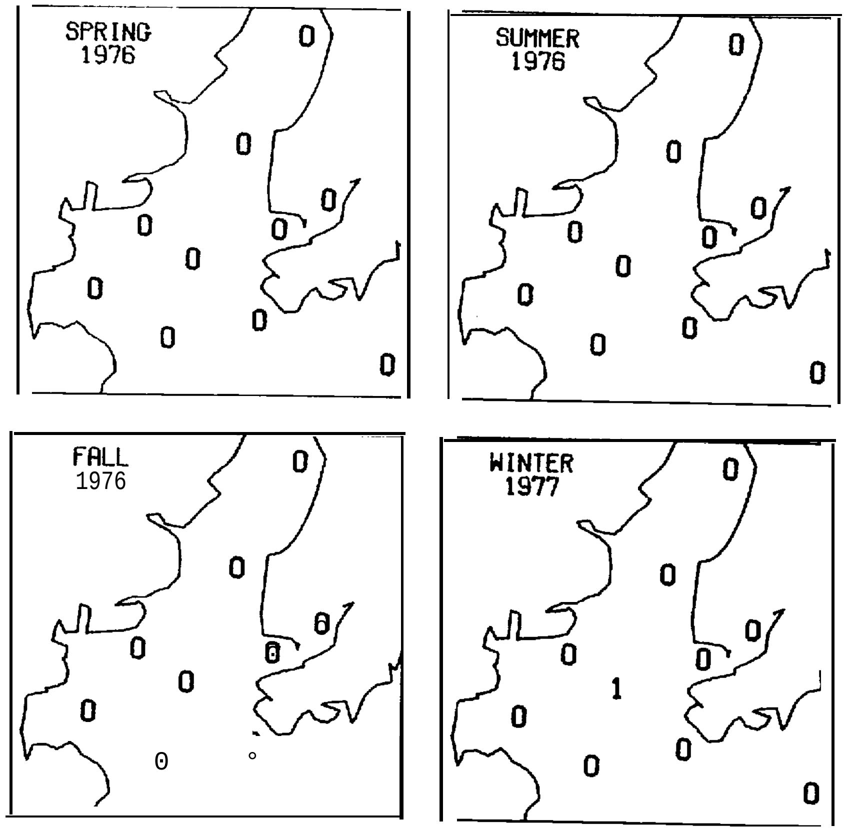


PANDALUS HYPSINOTUS

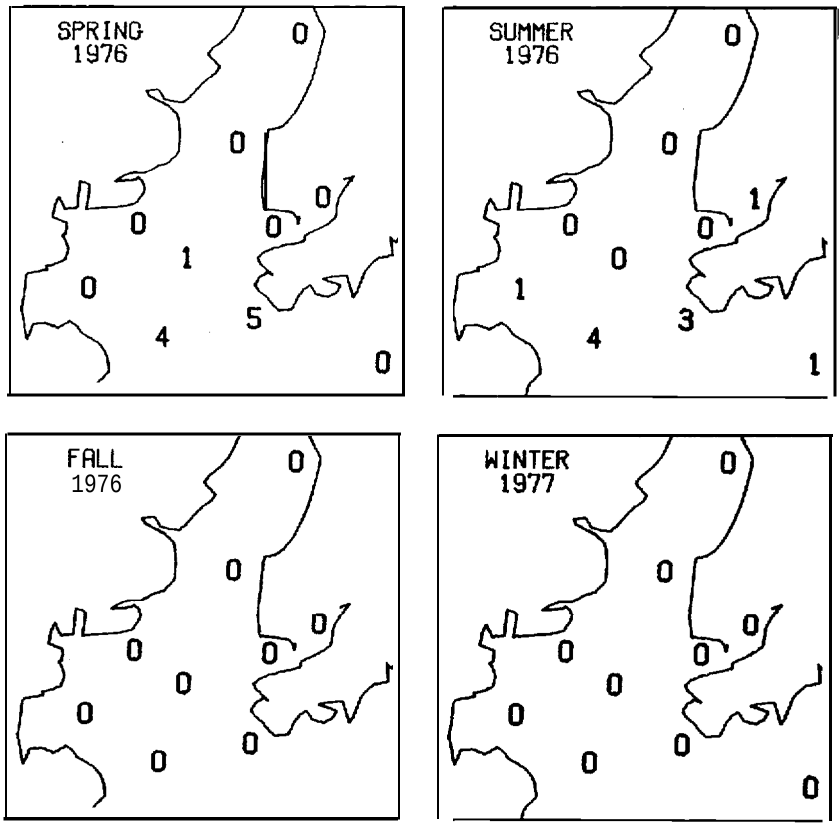
ZOEFV1O SQ M



PANDALUS PLATYCEROS
ZOEA/10 SQ M

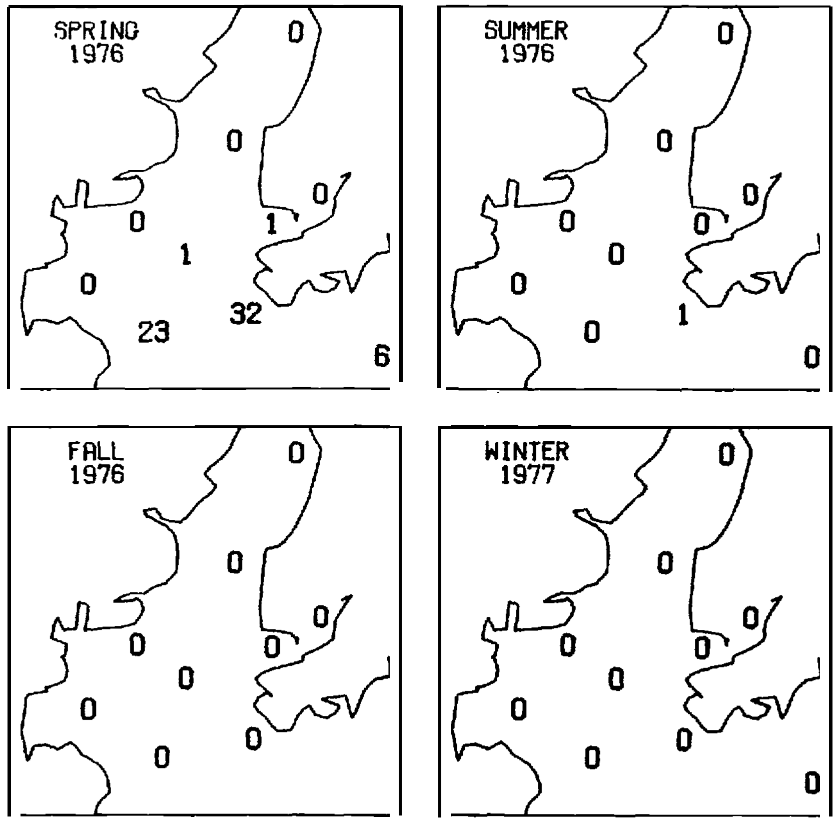


PANDALUS STENOLEPIS
ZOEA/10 SQ M



PANDALUS MONTAGUI TRIDENS

N3EFV1O SQ M

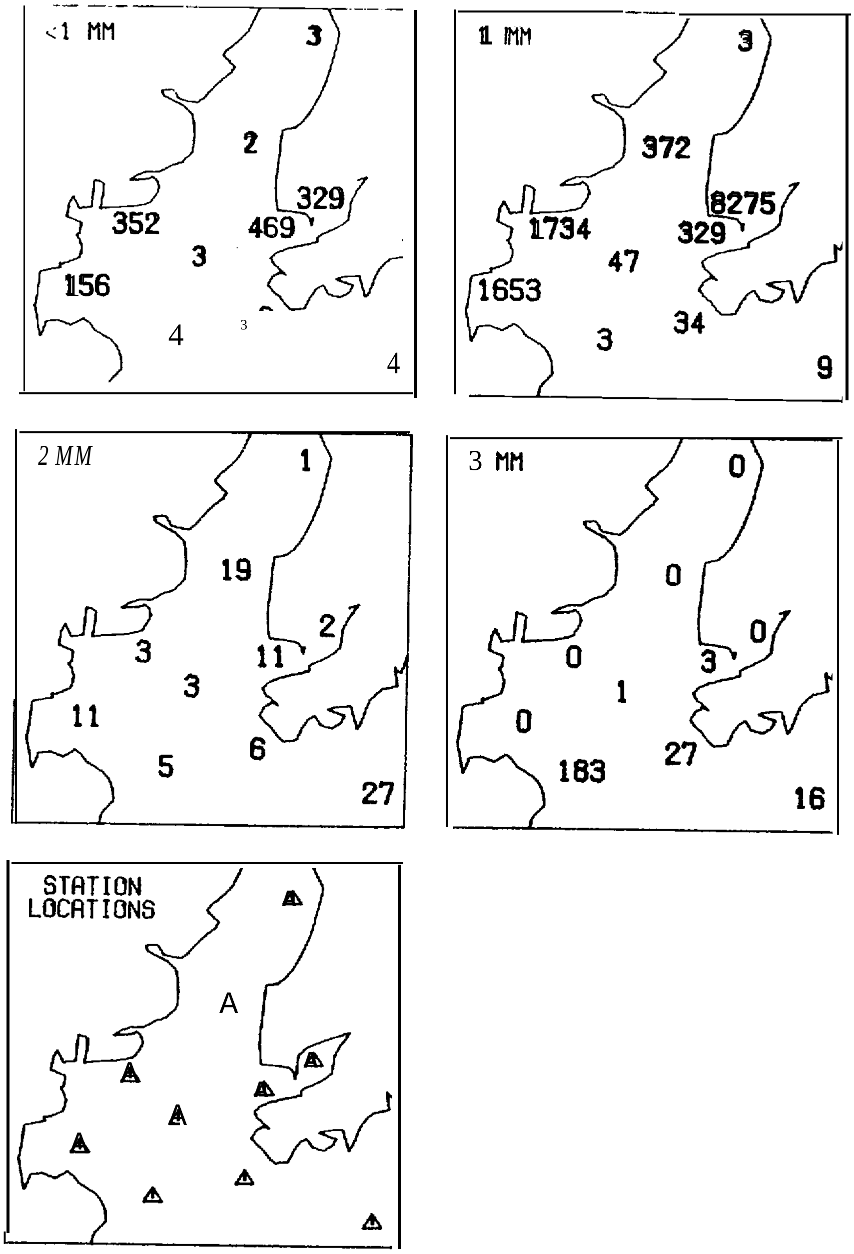


APPENDIX E

Density distributions per 10 square meters

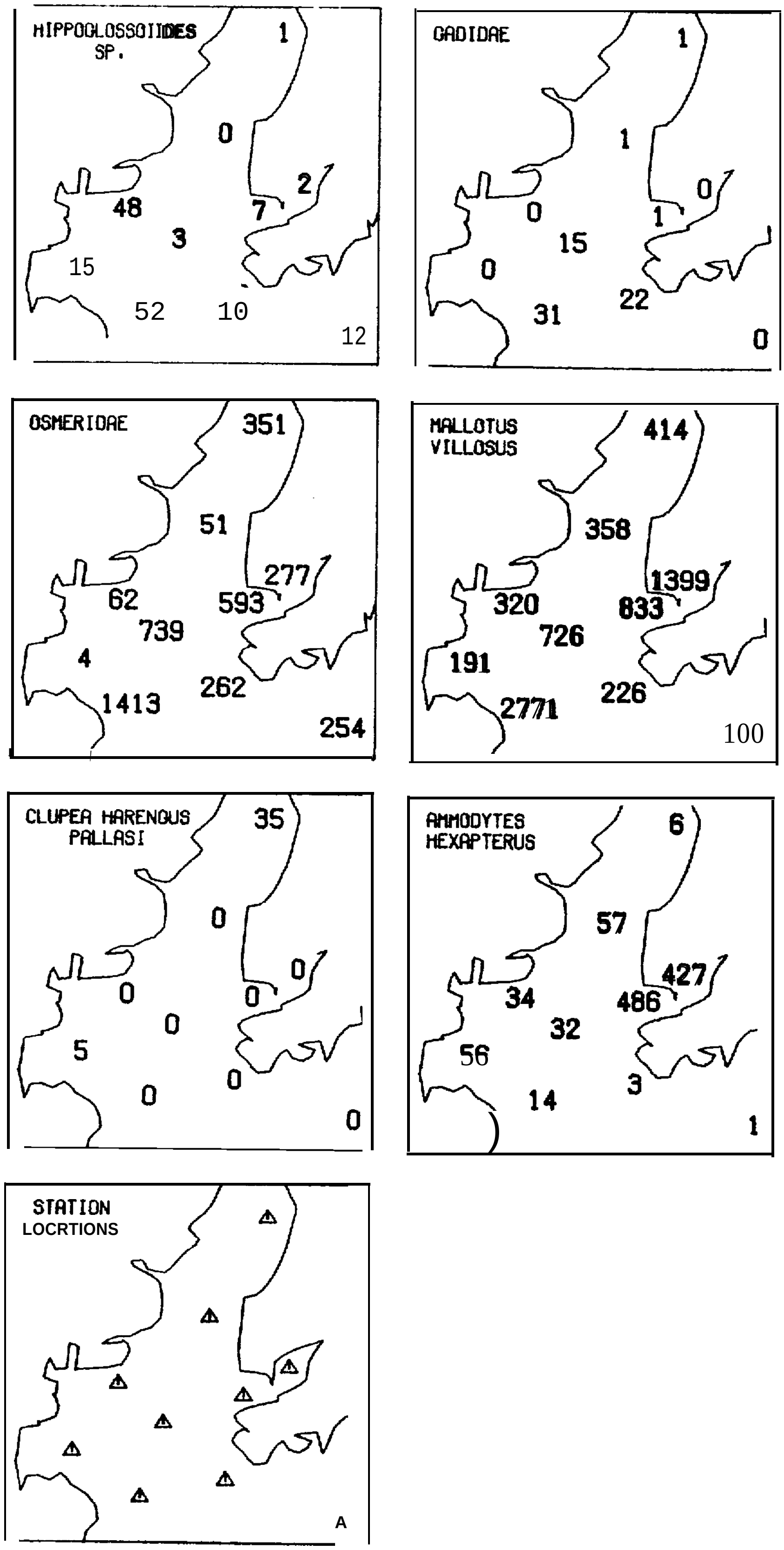
for one year, 1976-1977.

FISH EGGS
ANNUAL ABUNDANCE/10 SQ M

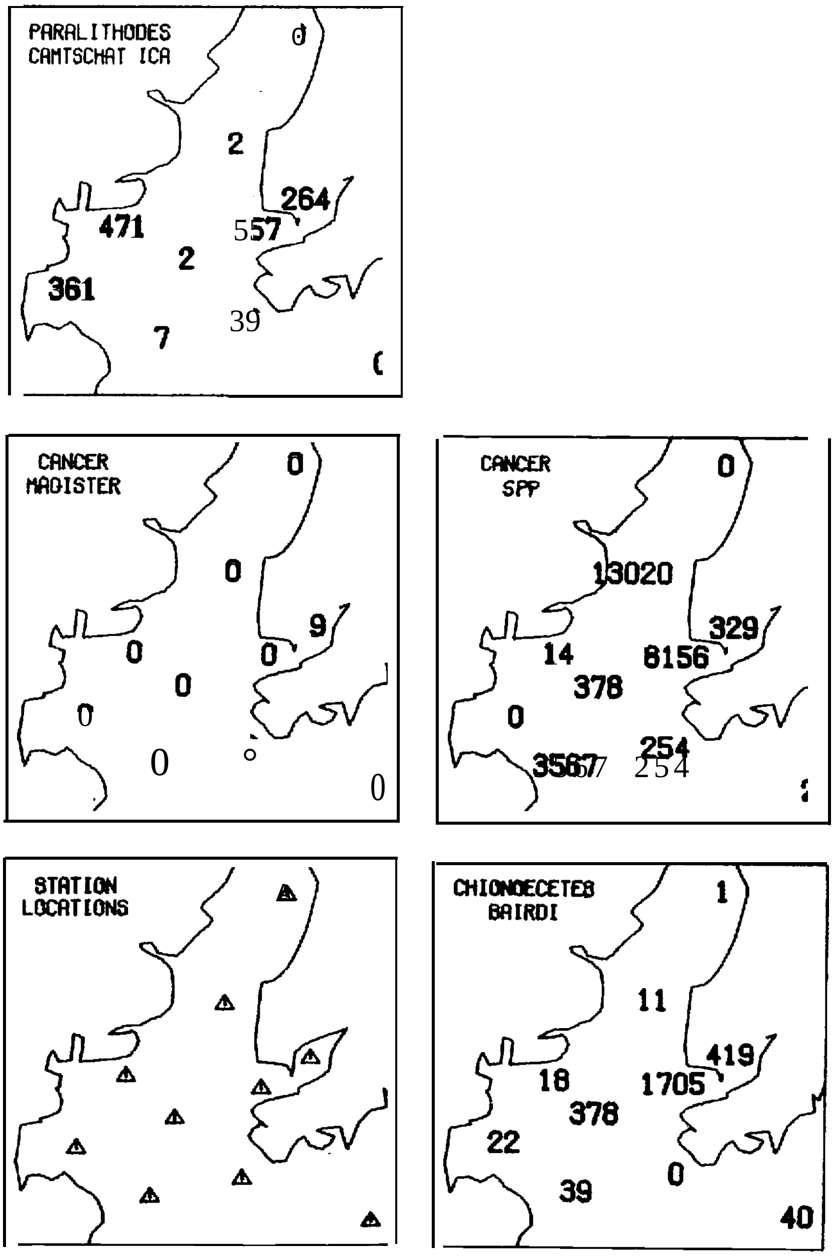


FISH LARVAE

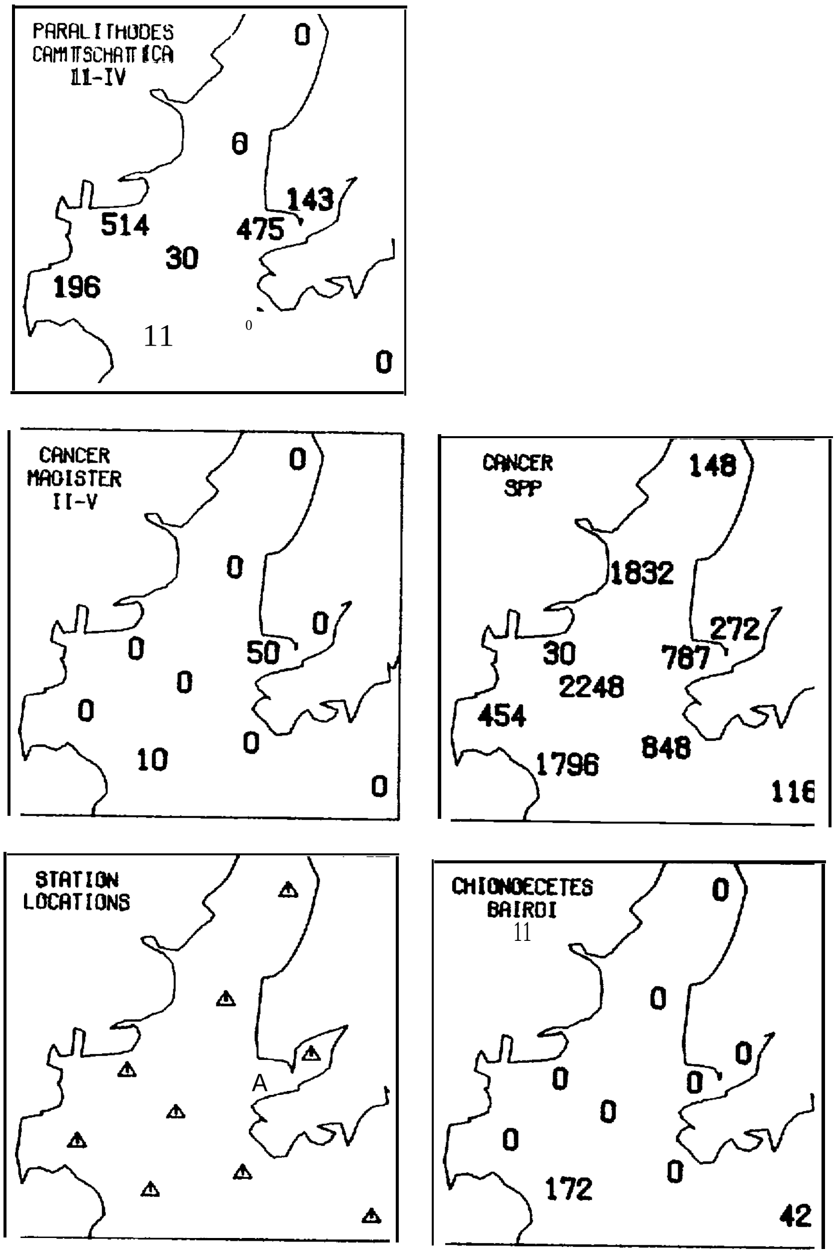
ANNUAL ABUNDANCE/10 SQ M



CRABS (STAGE I 1
ANNUAL ABUNDANCE/10 SQ M

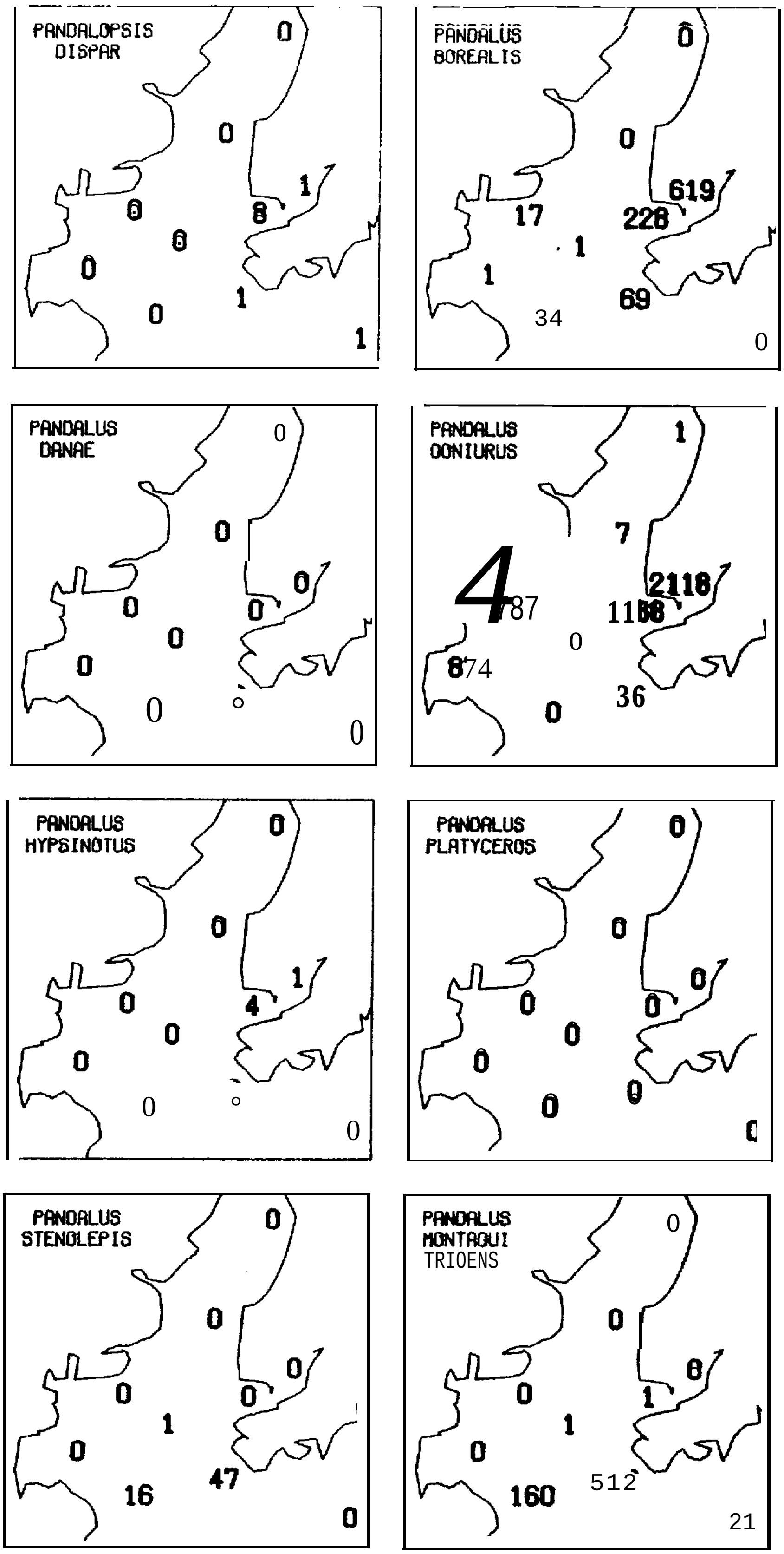


CRABS (LATE ZOEA)
ANNUAL ABUNDANCE/10 SQ M

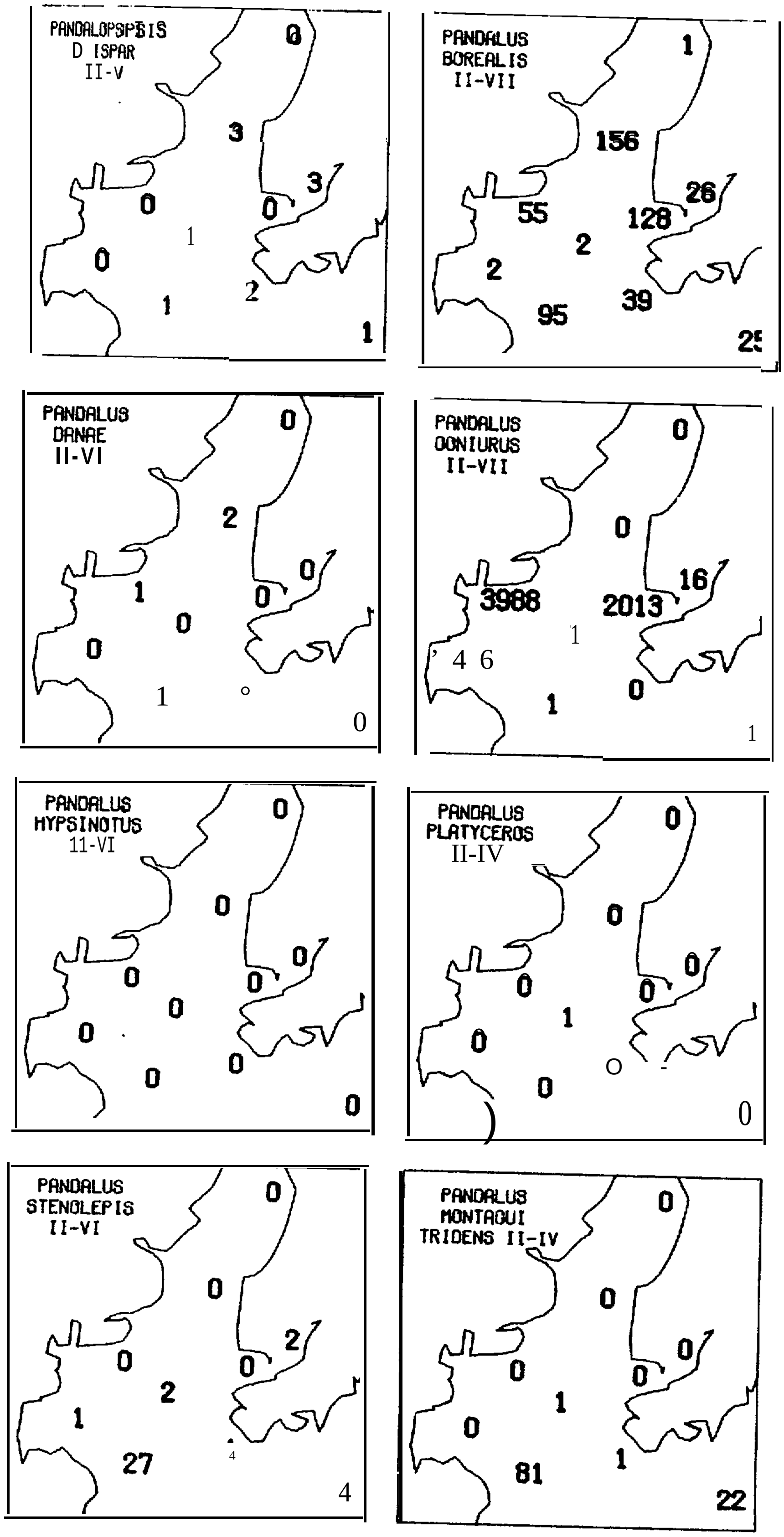


SHRIMP (STAGE 11

ANNUAL ABUNDANCE/10 SQ M



SHRIMP (LATE ZOEA)
ANNUAL ABUNDANCE/10 SQ M



APPENDIX F

Density Per 10 square meters, 1978.

FISH EGGS/10 SQ M

STATION	SIZE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	<1 MM	1	93	0	0	65	0	0
	1 MM	17	0	0	0	0	0	0
2	<1 MM	51	370	0	0	0	59	0
	1 MM	291	23	0	0	0	0	0
	3 MM	2	0	0	0	0	0	0
3	<1 MM	0	152	0	0	0	117	0
	1 MM	72	0	0	0	0	0	0
	2 MM	4	0	0	0	0	0	0
	3 MM	4	0	0	0	0	0	0
4	<1 MM	0	445	495	100	0	0	0
6	<1 MM	151	350	24	24	0	0	0
	1 MM	123	12	0	0	0	0	0
7	<1 MM	108	17	91	225	0	28	0
	1 MM	20	0	7	0	0	0	0
8	<1 MM	148	0	0	0	150	0	0
	1 MM	913	8	0	0	0	0	0
9	<1 MM	72	44	49	28	46	0	0
	1 MM	505	35	8	0	0	0	0
	2 MM	0	0	0	0	0	0	18
10	<1 MM	10	250	41	0	22	c	0
	1 MM	0	2A	0	0	0	o	0
11	<1 MM	18	1433	27	532	136	12	0
	1 MM	0	43	0	33	11	0	0
12	<1 MM	0	352	10	181	0	0	0
	1 MM	11	23	0	0	0	0	0
13	<1 MM	0	0	0	11	0	0	0
	1 MM	0	0	0	11	0	0	0
14	<1 MM	11	12	0	0	0	0	0
	1 MM	11	G	0	0	0	0	0

CONTINUATION-FISH EGGS/10 SQ M

15	<1 MM	0	0	12	11	0	0	0
	1 MM	54	20	12	0	0	0	0
16	<1 MM	0	23	0	0	0	0	0
	1 MM	0	11	25	0	0	0	0
17	<1 MM	0	11	0	0	0	0	0
	1 MM	0	100	10	0	0	0	0
18	<1 MM	215	0	39	0	0	0	0
	1 MM	174	0	0	0	0	0	0
	2 MM	8	0	0	0	0	0	0
19	<1 MM	1570	640	113	0	0	0	0
	1 MM	815	38	0	0	0	0	0
	2 MM	7	0	0	0	0	0	0
20	<1 MM	41	164	55	0	0	0	0
	1 MM	309	297	0	0	0	0	0
	2 MM	0	0	9	0	0	0	0
21	<1 MM	456	258	34	0	0	0	0
	1 MM	194	33	6	0	0	0	0
22	<1 MM	826	801	51	0	0	0	0
	1 MM	79	94	0	0	0	0	0
23	<1 MM	541	476	40	0	0	0	9
	1 MM	46	35	0	0	0	0	0
24	<1 MM	1090	482	40	0	0	0	0
	1 MM	623	36	0	0	0	0	0
25	<1 MM	0	13?	11	0	0	0	0
	1 MM	0	3	0	0	0	0	0
26	<1 MM	0	666	24	0	0	0	0
	1 MM	0	43	0	0	0	0	0
27	<1 MM	0	76	0	0	0	0	0
	1 MM	0	4	0	0	0	0	0
28	<1 MM	179	252	194	0	0	0	0
	1 MM	192	52	10	0	0	0	0

CONTINUATION-FISH EGGS/10 SQ M

29	<1 MM	29	330	170	0	0	0	
	1 MM	227	217	50	0	0	0	0
30	<1 MM	9	22	43	11	C	0	
	1 MM	120	66	64	0	G	0	
	2 MM	0	0	11	0	0	0	
31	<1 MM	15	0	0	0	0	C	
	1 MM	68	0	20	0	0	0	
32	<1 MM	160	12	29	0	13	0	
	1 MM	813	0	0	0	0	0	0

AMMODYTES HEXAPTERUS/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	LAR	8	0	0	0	0	0	0
2	LAR	13	0	0	0	0	0	0
3	LAR	127	0	0	0	0	0	0
6	LAR	28	0	0	0	0	0	0
7	LAR	73	9	0	0	0	0	0
8	LAR	186	0	0	0	0	0	0
9	LAR	50	18	0	0	0	0	0
10	LAR	10	0	10	0	0	0	0
11	LAR	2[illegible]1	95	0	0	0	0	0
12	LAR	110	47	0	0	0	0	0
13	LAR	0	0	10	0	0	0	0
14	LAR	22	0	0	0	0	0	0
15	LAR	534	49	0	0	0	0	0
16	LAR	27	23	0	0	0	0	0
17	LAR	0	22	0	0	0	0	0
18	LAR	25	0	10	0	0	0	0
20	LAR	46	41	0	0	0	0	0
21	LAR	0	8	0	0	0	0	0
22	LAR	6	0	0	0	0	0	0
23	LAR	4	0	0	0	0	0	0

CONTINUATION-AMMODYTES HEXAPTERUS/10 SQ M

28	LAR	13	0	0	0	0	0	
29	LAR	7	0	0	0	0	0	0
30	LAR	25	0	0	0	0	0	0
31	LAR	30	10	0	0	0	0	0
32	LAR	45	0	0	0	0	0	0

CLUPEA HARENGUS PALLASI/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	LAR	0	10	0	0	0	0	0
2	LAR	0	35	0	0	0	0	0
10	LAR	0	0	10	0	0	0	0
18	LAR	0	0	0	9	0	0	0
19	LAR	0	19	97	0	0	0	0
21	LAR	0	8	0	0	0	0	0
22	LAR	0	119	0	0	0	0	0
23	LAR	0	329	24	0	0	0	0
24	LAR	0	14	0	0	0	0	0
25	LAR	0	321	0	0	0	0	0
26	LAR	0	342	47	0	0	0	0
27	LAR	0	76	0	0	0	0	0
28	LAR	0	0	48	0	0	0	0

CONTINUATION-CLUPEA HARENGUS PALLASI/10 SQ M

31	LAR	0	10	0	0	0	0	0

GADIDAE/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	8 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
8	LAR	26	0	0	0	0	0	0
11	LAR	27	0	0	0	0	0	0
12	LAR	11	0	0	0	0	0	0
14	LAR	33	0	0	0	0	0	0
15	LAR	154	0	0	0	0	0	0
	JUV	0	20	0	0	0	0	0
16	LAR	46	0	0	0	0	0	0
28	LAR	0	0	0	0	0	0	0
30	JUV	0	0	0	11	0	0	0
31	LAR	15	0	0	0	0	0	0
	JUV	0	20	0	0	0	0	0

HIPPOGLOSSOIDES ELASSODON/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	8 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
3	LAR	4	0	0	0	0	0	0
6	LAR	47	0	0	0	0	0	0
8	LAR	26	0	0	0	0	0	0
11	LAR	9	0	0	0	0	0	0

CONTINUATION-HIPPOGLOSSOIDES ELASSODON/10 SQ M

12	LAR	11	0	0	0	0	0	0
13	LAR	0	12	0	0	0	0	
16	LAR	9	0	0	0	0	0	
18	LAR	25	0	0	0	0	0	
19	LAR	7	0	0	0	0	0	0
22	LAR	39	0	0	0	0	0	
23	LAR	8	0	0	0	0	0	
26	LAR	13	0	0	0	0	0	
29	LAR	7	0	0	0	0	0	

LIMANDA ASPERA/10 SQ M

STATION	STAGE	19 MY Y JN	26 JN 6 JL	11 JL 1b JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 S?	20 SP 27 SP
2	LAR	5	11	0	72	83	0	0
3	LAR	0	22	0	0	0	0	0
6	LAR	0	12	0	0	0	0	0
11	LAR	0	10	0	21	0	12	0
17	LAR	0	0	10	0	0	0	0
18	LAR	0	0	126	0	0	0	0
19	LAR	22	b	8	0	0	0	0
20	LAR	0	0	27	0	0	0	0
21	LAR	0	8	25	0	0	0	0

CONTINUATION-LIMANDA ASPERA/10 SQ M

22	LAR	13	26	51	0	0	0	0
23	LAR	11	84	40	0	0	0	0
24	LAR	0	0	32	0	0	0	0
28	LAR	0	17	87	0	0	0	0
29	LAR	0	47	20	11	10	0	0

MALLOTUS VILLOSUS/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	LAR	3	62	0	0	130	0	0
2	LAR	5	498	0	0	0	0	135
3	LAR	10	11	0	0	93	350	0
4	LAR	0	345	19	400	0	0	43
6	LAR	0	945	275	60	160	59	0
7	LAR	0	349	273	17	0	47	33
8	LAR	0	225	104	24	60	19	8
9	LAR	0	280	387	95	19	0	9
10	LAR	0	511	82	32	121	0	0
11	LAR	9	477	746	54	497	24	0
12	LAR	0	199	170	126	0	137	58
13	LAR	0	489	480	90	96	0	0
14	LAR	0	1557	696	95	36	0	0

CONTINUATION-MALLOTUS VILLOSUS/10 SQ M

15	LAR	0	922	284	43	19	0	0
16	LAR	0	1621	312	47	76	0	0
17	LAR	0	45	184	11	0	0	0
18	LAR	0	0	667	35	10	0	0
19	LAR	0	659	355	0	0	0	0
20	LAR	0	10	329	0	0	0	0
21	LAR	0	275	176	0	0	0	0
22	LAR	0	307	34	0	0	0	0
23	LAR	0	154	40	0	0	0	26
24	LAR	0	94	130	0	0	0	0
25	LAR	0	13	11	0	0	0	0
26	LAR	0	422	147	0	0	0	0
27	LAR	0	18	0	0	0	0	0
28	LAR	0	261	619	0	9	0	0
29	LAR	0	1265	200	53	0	0	0
30	LAR	0	244	139	53	0	0	0
31	LAR	0	110	146	22	86	0	0
32	LAR	0	1356	99	37	250	0	0

OSMERIDAE/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
2	LAR	0	23	0	0	o	o	o
3	LAR	0	11	c	0	93	0	0
4	LAR	0	85	5	150	0	0	0
6	LAR	0	303	48	12	0	23	12
7	LAR	0	247	243	[illegible]	0	19	0
8	LAR	0	242	67	8	0	0	0
9	LAR	0	166	90	19	9	0	0
10	LAR	0	156	31	11	44	0	0
11	LAR	0	181	155	11	102	36	11
12	LAR	0	141	40	14	G	35	11
13	LAR	0	186	230	0	11	0	0
14	LAR	0	277	557	12	12	0	0
15	LAR	0	245	159	0	0	0	0
16	LAR	0	340	50	24	13	0	0
17	LAR	0	0	10	0	0	0	0
18	LAR	0	0	29	17	G	0	0
19	LAR	0	19	65	0	o	0	0
20	LAR	0	0	55	0	0	0	o
21	LAR	0	33	4	0	0	0	0
22	LAR	0	17	o	0	0	c	0

CONTINUATION-OSMERIDAE/10 SQ M

24	LAR	0	0	0	0	0	0	
25	LAR	0	3	4	0	0	0	
26	LAR	0	24	c	0	0	0	
27	LAR	0	a	0	0	0	0	
28	LAR	0	9	10	0	0	0	
29	LAR	0	132	c	21	0	0	
30	LAR	0	78	171	0	43	0	
31	LAR	0	20	45	11	375	C	0
32	LAR	0	444	79	22	25	0	0

ANOMURA/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	ZOE	104	421	0	76	130	55	107
2	ZOE	224	3381	0	500	663	529	0
3	ZOE	510	141	0	0	278	583	468
	MEG	0	22	0	0	93	0	0
4	ZOE	0	25	33	0	0	0	87
5	ZOE	0	0	0	0	55	0	33
6	ZOE	943	13773	2294	469	837	784	372
	MEG	0	0	0	36	36	12	12
7	ZOE	4545	0	0	167	0	38	57
	MEG	0	0	0	33	0	9	0
8	ZOE	8949	67	89	16	0	22.2	121
	MEG	0	0	30	8	0	9	0
9	ZOE	2138	1960	115	198	221	66	428
	MEG	0	0	33	28	0	0	0
10	ZOE	2640	83	449	235	110	0	66
	MEG	0	0	0	2A	0	0	11
11	ZOE	200	1317	7500	750	3929	1799	1997
	MEG	0	0	0	54	0	12	0
12	ZOE	1630	7325	7040	3598	0	2582	1690
	MEG	44	0	160	78	0	12	0
13	ZOE	3090	180	1400	75	75	0	0
	MEG	0	140	40	43	0	0	0
14	ZOE	1628	1448	2357	107	119	0	0
	MEG	0	24	128	0	24	0	0
15	ZOE	1051	1050	1592	0	19	0	0
	MEG	0	10	45	21	0	0	0

CONTINUATION-ANUMURA/10 SQ M

16	ZUE	93	id 1	267	333	13	0	0
	MEG	0	0	112	71	0	0	0
17	ZUE	0	490	1659	66	0	0	0
	MEG	0	0	41	0	0	0	0
18	ZUE	1475	0	5566	105	625	0	0
	MEG	0	0	155	0	10	0	0
19	ZUE	622	262	751	0	0	0	0
20	ZUE	466	574	730	0	&	0	0
	MEG	0	0	9	0	0	0	0
21	ZUE	1 72	633	193	0	0	0	8
22	ZUE	1861	1082	137	0	0	0	0
	MEG	0	0	0	0	0	0	16
23	ZUE	354	952	234	0	0	0	18
	MEG	0	0	0	0	0	0	9
24	ZUE	90	641	356	0	0	0	0
25	ZUE	0	132	4	0	0	0	0
26	ZUE	0	281	12	0	0	0	0
27	ZUE	0	30	0	0	0	0	0
28	ZUE	939	6410	968	270	1303	0	0
	MEG	0	0	39	0	9	0	0
29	ZUE	440	113	1080	477	600	0	0
	MEG	0	0	0	32	0	0	0
30	ZUE	2289	434	555	221	96	0	0
31	ZUE	365	0	195	183	199	0	0
	MEG	0	10	39	0	0	0	0
32	ZUE	916	216	1340	735	113	0	0
	MEG	0	0	157	11	0	0	0

BRACHYURA/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	ZOE	113	401	0	736	0	0	0
	MEG	1	0	0	0	0	0	0
2	ZOE	704	1250	0	572	414	59	0
3	ZOE	785	98	0	0	370	817	0
4	ZOE	0	95	67	200	1573	0	0
	MEG	0	15	33	0	0	0	0
5	ZOE	0	0	0	0	2530	0	0
6	ZOE	2$31	6907	956	253	222	199	12
	MEG	0	187	191	60	12	0	0
7	ZOE	16181	545	243	83	0	234	0
	MEG	470	0	0	2667	0	0	0
8	ZOE	1337	200	47+	16	20	102	8
	MEG	0	0	1570	568	0	0	0
9	ZOE	2138	13440	0	10	516	33	0
	MEG	0	0	115	425	37	0	9
10	ZOE	3920	167	449	21	385	0	0
	MEG	80	0	449	853	0	0	0
11	ZOE	218	580	2185	108	407	290	52
	MEG	0	0	728	152	0	0	11
12	ZOE	3613	10143	2080	98	0	80	35
	MEG	0	0	4800	450	0	0	Al
13	ZOE	4442	2186	120	0	447	0	0
	MEG	97	0	4440	562	0	0	0
14	ZOE	4223	1653	86	12	13i	0	0
	MEG	0	12	771	251	0	0	0
15	ZOE	2119	667	45	0	145	0	0
	MEG	18	10	91	53	0	0	0

CONTINUATION-BRACHYURA/10 SQ M

16	ZOE	2725	1054	62	0	177	0	0
	MEG	0	0	100	665	0	0	0
17	ZOE	0	646	102	11	0	0	0
	MEG	0	0	0	55	0	0	0
18	ZOE	1044	0	5568	165	175	0	0
	MEG	0	0	155	0	0	0	0
19	ZOE	96	80	420	0	0	0	0
	MEG	0	0	0	0	0	0	8
20	ZOE	730	410	91	0	0	0	0
	MEG	0	21	18	0	0	0	0
21	ZOE	50	3917	932	0	0	0	0
22	ZOE	328	400	966	0	0	0	0
	MEG	13	0	0	0	0	0	0
23	ZOE	130	364	1106	0	0	0	18
	MEG	0	14	0	0	0	0	0
24	ZOE	7	706	1611	0	0	0	5
	MEG	0	7	16	0	0	0	0
25	ZOE	0	3	0	0	0	0	0
	MEG	0	0	4	0	0	0	0
26	ZOE	0	55	6	0	0	0	0
27	ZOE	0	14	0	0	0	0	0
28	ZOE	326	4738	1626	130	19	0	0
	MEG	0	279	77	20	0	0	0
29	ZOE	95	47	160	53	250	0	0
	MEG	0	0	0	11	0	0	0
30	ZOE	2153	87	288	23	53	0	0
	MEG	0	0	53	23	0	0	0
31	ZOE	2310	360	234	0	44	0	0
	MEG	0	0	76	6	0	0	0

CONTINUATION-BRACHYURA/10 SQ M

32	ZOE	916	384	906	0	414	0	0
	MEG	0	0	512	55	0	0	0

CANCER MAGISTER/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	8 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	II	3	0	0	0	0	0	0
2	II	0	185	0	0	0	0	0
3	I	28	0	0	0	0	0	0
	II	14	43	0	0	0	0	0
4	II	0	15	0	0	0	0	0
6	I	38	0	0	0	0	0	0
	II	0	560	191	0	0	0	0
7	II	0	130	121	0	0	0	0
8	I	1131	0	0	0	0	0	0
	II	0	467	59	0	0	9	0
9	I	173	0	17	0	0	0	0
	II	0	2800	329	0	0	0	0
	III	0	0	214	0	0	0	0
	u	0	0	0	G	37	0	0
10	II	0	167	41	0	0	0	0
	III	0	0	163	0	0	0	0
	MEG	0	0	0	0	33	0	0
11	II	0	213	726	0	0	0	0
	III	0	0	219	0	0	0	0
	V	0	0	0	0	0	12	0
12	I	352	0	0	0	0	0	0
13	II	0	1878	0	0	0	0	0
	III	0	188	0	0	0	0	0

CONTINUATION-CANCER MAGISTER/10 SQ M

14	I	44	0	0	0	0	0	0
	V	0	0	0	0	12	0	0
15	II	0	10	0	0	0	0	0
16	II	0	0	87	0	0	0	0
	III	0	0	62	24	0	0	0
	IV	0	0	25	0	0	0	0
	V	0	0	0	24	0	0	0
17	II	0	22	103	0	0	0	0
	III	0	0	20	0	0	0	0
19	II	0	30	0	0	0	0	0
	III	0	0	8	0	0	0	0
20	II	20	205	0	0	0	0	0
21	II	0	33	17	0	0	0	0
22	II	39	77	0	0	0	0	0
	III	0	9	0	0	0	0	0
23	II	8	7	0	0	0	0	0
24	II	0	14	0	0	0	0	0
26	II	0	6	0	0	0	0	0
28	II	19	0	77	0	0	0	0
29	II	15	19	0	0	0	0	0
30	II	0	0	11	0	0	0	0
	III	0	0	21	0	0	0	0
31	II	243	0	39	0	0	0	0
32	II	550	0	237	0	0	0	0
	III	0	0	197	0	0	0	0
	V	0	0	0	0	13	0	0
	MEG	0	0	0	0	13	0	0

CANCER SPP/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	I	71	113	0	0	65	0	0
	III	0	0	0	115	0	0	0
	ZOE	3	0	0	0	0	0	0
2	I	20	1621	0	72	0	0	0
	II	0	231	0	72	0	0	0
	V	0	0	0	0	63	59	0
	ZOE	10	0	0	0	0	0	0
	I	592	444	0	0	0	0	0
	II	0	206	0	0	0	0	0
	III	0	0	0	0	0	117	0
	V	0	0	0	0	185	0	0
	ZOE	28	0	0	0	0	0	0
4	I	0	1325	67	0	0	0	0
	II	0	255	224	0	0	0	43
	III	0	0	76	0	0	0	0
	V	0	0	0	0	150	0	0
	I	0	0	0	0	0	87	0
	I	982	42933	3632	12	0	23	0
	II	0	25200	17014	0	12	12	0
	III	0	373	1529	120	12	35	0
	IV	0	0	0	457	0	12	0
	V	0	0	0	97	25	293	0
	MEG	0	0	0	0	25	246	90
	I	0	16901	3156	50	0	0	8
	II	0	954	2468	17	0	9	41
	III	0	136	728	83	0	9	0
	IV	0	0	0	550	0	19	0
	V	0	0	0	267	0	84	16
	ZOE	13793	0	0	0	0	0	0
	MEG	0	0	0	0	0	216	0
b	I	11931	6533	711	0	0	0	0
	II	0	1067	859	0	10	0	0
	III	0	67	415	112	20	0	0
	IV	0	0	0	232	90	0	0
	V	0	0	0	32	640	37	0
	ZOE	617	0	0	0	0	0	0
	MEG	0	0	0	0	80	28	6

CONTINUATION-CANCER SPP/10 SQ M

9	I	3755	7560	346	0	74	c	0
	II	0	1120	511	0	0	0	0
	III	0	280	99	38	0	0	0
	IV	0	0	0	47	74	a	9
	V	0	0	0	28	1769	55	Y
	ZOE	289	0	99	0	o	0	o
	MEG	0	c!	0	0	553	66	134
10	I	11040	1720	204	11	0	o	11
	II	0	261	1346	G	o	0	1A
	III	0	0	1835	21	0	0	o
	IV	0	0	0	139	33	0	0
	V	0	0	0	85	484	0	0
	MEG	0	0	0	451	o	0	165
11	I	545	3355	1966	76	c	o	11
	II	0	2036	16967	67	o	12	31
	III	0	43	5752	217	0	12	31
	IV	0	0	0	369	90	12	0
	V	0	0	0	98	632	121	11
	MEG	0	0	0	0	0	156	20
12	I	1763	10894	2400	39	o	12	0
	II	o	6010	5920	59	0	12	0
	III	0	752	3680	235	0	12	0
	IV	0	0	0	2171	0	0	23
	V	0	0	0	509	0	80	35
	MEG	0	J	0	0	0	80	199
13	I	0	6419	0	11	o	0	0
	II	0	140	960	Al	0	0	0
	III	0	0	560	32	0	0	0
	IV	0	0	0	64	0	c	0
	V	0	0	0	43	43	o	0
	ZOE	2697	0	0	o	0	0	0
	MEG	0	0	0	0	138	0	0
14	I	1699	1014	171	24	0	0	0
	II	o	0	515	36	12	0	0
	III	0	0	643	84	12	o	0
	IV	0	0	86	60	24	c	0
	V	0	0	43	47	131	o	0
	ZOE	44	0	0	o	0	0	0
	MEG	0	0	43	0	47	0	0

CONTINUATION-CANCER SPP/10 SQ M

15	I	181	177	1092	43	0	0	0
	II	0	79	2593	43	0	0	0
	III	Q	0	1865	117	0	0	0
	IV	0	0	91	181	19	0	0
	V	0	c	0	LA	183	0	0
	ZOE	18	0	0	0	0	0	0
	MEG	0	0	0	0	96	0	0
16	I	18	1451	199	0	0	0	0
	II	18	45	548	190	0	0	0
	III	0	Al	449	617	0	0	0
	IV	0	o	37	3800	0	0	0
	V	0	0	0	23?	13	0	0
	ZOE	0	0	50	0	0	0	0
	MEG	0	0	12	24	76	0	0
17	I	0	2250	1185	0	0	o	0
	II	0	245	899	154	0	0	0
	III	0	0	163	121	0	0	0
	IV	0	0	0	253	0	0	0
	V	0	0	0	11	0	0	0
	ZOE	0	0	102	0	0	0	0
18	I	83	0	1624	35	0	0	0
	II	66	0	309	123	0	0	G
	III	0	0	1237	131	0	c	o
	IV	0	0	0	2 19	20	o	0
28	U	0	0	0	26	29	0	0
	MEG	0	0	0	o	20	c	0
19	I	37	13	105	0	0	o	0
	ii	7	0	50	0	0	0	o
	III	0	0	32	0	0	0	0
	MEG	0	0	0	0	0	0	8
20	I	56	2950	785	0	0	0	0
	II	0	205	858	0	0	0	0
	III	0	0	310	0	0	0	0
	IV	0	0	9	0	0	0	0
21	I	0	83	37b	0	0	0	0
	II	0	0	8	0	0	0	0
	III	0	0	17	0	0	0	0
	MEG	0	0	o	0	0	0	16

22	I	0	43	9	C	0	0	0
	II	0	0	5	0	o	0	0
	III	0	0	60	u	0	c	0
	ZEE	52	0	o	o	0	o	8
23	I	4	C	24	6	0	0	o
	II	o	7	0	0	0	0	0
	MEG	0	o	0	0	0	0	9
24	I	3	7	105	0	0	0	0
	II	0	0	49	0	0	0	0
25	II	0	0	4	0	0	0	0
27	i	0	2	0	0	0	0	0
28	I	83	9755	348	0	0	0	0
	II	0	19510	852	10	0	C	0
	III	0	1115	387	160	19	0	0
	IV	0	0	0	190	28	o	0
	V	0	0	C	90	9	C	0
	MEG	0	0	0	0	9	0	0
29	I	66	605	1080	0	10	0	0
	II	0	1313	2680	90	0	0	0
	III	0	10	1040	148	0	0	0
	Iv	0	0	0	170	30	0	0
	v	0	0	0	74	0	o	0
	MEG	0	0	0	40	0	0	0
30	I	171	3991	1664	0	0	0	0
	II	0	5382	2336	35	0	0	0
	III	0	.87	277	12&	0	0	0
	IV	0	0	0	163	10	0	0
	V	0	0	0	128	96	0	0
	MEG	o	0	0	0	53	0	0
31	I	5594	1960	623	0	33	0	0
	II	0	690	6115	11	33	0	0
	III	0	0	1168	22	44	0	0
	IV	0	0	0	129	22	0	o
	V	0	0	0	32	287	0	0
	ZOE	0	20	o	0	0	0	0
	MEG	0	0	C	11	55	0	0

CONTINUATION-CANCER SPP/10 SQ M

32	I	15665	2160	591	0	25	0	0
	II	0	864	3466	0	13	0	0
	III	0	24	2127	0	13	0	0
	IV	0	0	0	22	25	0	0
	V	0	0	0	55	1191	0	0
	MEG	0	0	0	22	239	0	0

CHIONOECETES BAIRDI/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	I	A 79	0	0	0	0	0	0
2	I	2519	0	0	0	0	0	0
3	I	2176	0	0	0	0	0	0
5	MEG	0	0	0	0	55	0	0
6	I	755	0	0	0	0	0	0
7	I	1411	0	0	0	0	0	0
	II	157	0	0	0	0	0	0
8	I	6023	200	0	0	0	0	0
	II	0	67	0	0	0	0	0
9	I	4565	280	0	0	0	0	0
	II	0	1960	0	0	0	0	0
10	I	0	10	0	0	0	0	0
11	I	246	0	0	0	0	0	0
12	I	0	370	0	0	0	0	0
	II	44	0	0	0	0	0	0
14	II	44	0	0	0	0	0	0
	MEG	44	0	0	0	0	0	0

CONTINUATION-CHIONOECETES BAIRDI/10 SQ M

15	I	724	0	0	0	0	0	0
	MEG	36	0	0	0	0	0	0
16	I	0	136	0	0	0	0	0
	II	0	34	37	0	0	0	0
	MEG	37	0	0	0	0	0	0
20	I	71	0	0	0	0	0	0
22	I	26	0	0	0	0	0	0
24	I	3	0	0	0	0	0	0
28	I	128	0	0	0	0	0	0
29	I	315	0	0	0	0	0	0
30	I	137	0	0	0	0	0	0
31	I	2067	0	0	0	0	0	0
32	I	733	0	0	0	0	0	0

PARALITHODES CAMTSCHATICA/10 SQ M

ST AT LEN	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	III	7	0	0	0	0	0	0
	IV	10	0	0	0	0	0	0
3	III	14	0	0	0	0	0	0
	IV	14	0	0	0	0	0	0
7	III	157	0	0	0	0	0	0
	IV	470	0	0	0	0	0	0
8	III	514	0	0	0	0	0	0
	IV	103	0	0	0	0	0	0
9	III	58	0	0	0	0	0	0

CONTINUATION-PARALITHODES CAMTSCHATICA/10 SQ M

10	III	240	0	0	0	0	0	0
	IV	80	0	0	0	0	0	0
11	III	9	0	0	0	0	0	0
	IV	46	0	0	0	0	0	0
12	IV	220	0	0	0	0	0	0
13	II	97	0	0	0	0	0	0
	III	97	0	0	0	0	0	0
	IV	97	0	0	0	0	0	0
14	MEG	44	0	0	0	0	0	0
16	III	37	0	0	0	0	0	0
	IV	18	0	0	0	0	0	0
20	II	5	0	0	0	0	0	0
22	III	13	0	0	0	0	0	0
	IV	0	9	0	0	0	0	0
23	III	4	0	0	0	0	0	0
28	MEG	13	0	0	0	0	0	0
30	MEG	34	0	0	0	0	0	0
31	IV	122	0	0	0	0	0	0

PANDALOPSIS DISPAR/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
6	I	0	12	0	0	0	0	0
	II	0	12	0	0	0	0	0
7	II	10	0	0	0	0	0	0
9	I	15	0	0	0	0	0	0
	II	15	0	0	0	0	0	0
	III	15	0	0	0	0	0	0
10	I	0	10	0	0	0	0	0
12	A	11	0	0	19	0	0	0
13	II	0	10	0	0	0	0	0
31	III	15	0	0	0	0	0	0

PANDALUS BOREALIS/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	II	A1	0	0	0	0	0	0
	III	61	0	0	0	0	0	0
	IV	11	0	0	0	0	0	0
2	I	10	0	0	0	0	0	0
	II	5	0	0	0	0	0	0
	III	10	0	0	0	0	0	0
3	I	14	0	0	0	0	0	0
	AL	110	0	0	0	0	0	0
	III	276	0	0	0	0	0	0
	IV	69	11	0	0	0	0	0
6	IV	76	70	0	0	0	0	0
8	III	6	0	0	0	0	0	0
	IV	109	0	0	0	0	0	0

CONTINUATION-PANDALUS BOREALIS/10 SQ M

9	IV	145	0	0	0	0	0	0
11	IV	372	10	9	0	0	0	0
	V	9	0	0	0	0	0	0
12	IV	22	0	0	0	0	0	0
13	IV	36	12	0	0	0	0	0
14	V	44	0	0	0	0	0	0
15	IV	0	20	34	0	0	0	0
16	IV	9	0	0	12	0	0	0
17	IV	0	67	0	0	0	0	0
20	IV	0	72	183	0	0	0	0
22	IV	0	17	0	0	0	0	0
23	IV	0	28	0	0	0	0	0
26	IV	0	12	0	0	0	0	0
28	IV	0	52	0	0	0	0	0
29	IV	0	10	0	0	0	0	0
30	V	0	11	0	0	0	0	0

PANDALUS DANAE/10 SQ M

STATION	STAGE	19 MY 9 JN	24 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
3	II	28	0	0	0	0	0	0
16	V	0	34	0	0	0	0	0
25	II	0	5	0	0	0	0	0

CONTINUATION-PANDALUS DANAE/10 SQ M

26	III	0	0	0	0	0	0	0

PANDALUS GONIURUS/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 7 SP	20 SP 27 SP
1	II	22	0	0	0	0	0	0
	III	133	0	0	0	0	0	0
2	I	20	0	0	0	0	0	0
	II	25	0	0	0	0	0	0
	III	25	0	0	0	0	0	0
3	I	55	0	0	0	0	0	0
	II	83	0	0	0	0	0	0
	III	124	0	0	0	0	0	0
6	III	38	0	0	0	0	0	0
	IV	76	0	0	0	0	0	0
7	III	39	0	0	0	0	0	0
	IV	39	0	0	0	0	0	0
8	III	32	0	0	0	0	0	0
	IV	540	0	0	0	0	0	0
9	III	43	0	0	0	0	0	0
	IV	347	0	0	0	0	0	0
	V	15	0	0	0	0	0	0
11	III	73	0	0	0	0	0	0
	IV	554	0	0	0	0	0	0
12	III	33	0	0	0	0	0	0
	IV	55	0	0	0	0	0	0
	V	0	11	0	0	0	0	0
13	IV	12	0	0	0	0	0	0
14	IV	11	0	0	0	0	0	0

CONTINUATION-PANDALUS GONIURUS/10 SQ M

15	II	9	0	0	0	0	0	0
	III	82	0	0	0	0	0	0
	IV	54	0	0	0	0	0	0
17	V	0	11	0	0	0	0	0
18	IV	8	0	0	0	0	0	0
19	III	7	0	0	0	0	0	0
	IV	15	0	0	0	0	0	0
	V	0	13	0	0	0	0	0
20	II	5	0	0	0	0	0	0
	III	5	0	0	0	0	0	0
	IV	30	72	0	0	0	0	0
	V	0	143	0	0	0	0	0
21	II	6	0	0	0	0	0	0
	III	6	0	0	0	0	0	0
	IV	17	0	0	0	0	0	0
	V	0	0	0	0	0	0	0
22	III	26	0	0	0	0	0	0
	IV	79	17	0	0	0	0	0
	V	0	51	0	0	0	0	0
23	IV	30	0	0	0	0	0	0
	V	0	7	16	0	0	0	0
28	V	0	43	19	0	0	0	0
29	IV	7	0	0	0	0	0	0
30	IV	43	0	0	0	0	0	0
	V	0	22	11	0	0	0	0

PANDALUS HYPSINOTUS/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
4	II	0	0	5	0	0	0	0
6	VI	0	0	24	0	0	0	0
12	VI	0	0	20	0	0	0	0
29	III	0	0	10	0	0	0	0

PANDALUS MONTAGUITRIDENS/10SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
16	III	9	0	0	0	0	0	0

PANDALUS STENOLEPIS/10 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
13	I	0	35	0	0	0	0	0
	II	0	0	10	0	0	0	0
	III	0	0	50	0	0	0	0
	IV	0	0	20	0	0	0	0
14	I	0	12	0	0	0	0	0
15	III	0	0	12	0	0	0	0
16	II	0	11	12	0	0	0	0
	III	0	11	12	0	0	0	0
	IV	0	11	0	12	0	0	0
32	I	0	12	0	0	0	0	0

APPENDIX G

Density per 1000 cubic meters, 1978.

FISH EGGS / 1000 CU M

STATION	SIZE	19 MY Y JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	<1 MM	3	250	0	0	250	0	0
	1 MM	36	0	0	0	0	0	0
2	<1 MM	131	842	0	0	0	125	0
	1 MM	745	53	0	0	0	0	0
	3 MM	6	0	0	0	0	0	0
3	<1 MM	0	292	0	0	0	167	0
	1 MM	139	0	0	0	0	0	0
	2 MM	7	0	0	0	0	0	0
	3 MM	7	0	0	0	0	0	0
4	<1 MM	0	4450	4952	1000	0	0	0
6	<1 MM	225	500	26	34	0	0	0
	1 MM	183	17	0	0	0	0	0
7	<1 MM	449	74	414	900	0	94	0
	1 MM	82	0	34	0	0	0	0
8	<1 MM	621	0	0	0	714	0	0
	1 MM	5071	42	0	0	0	0	0
9	<1 MM	278	125	176	83	132	0	0
	1 MM	1944	100	29	0	0	0	0
	2 MM	0	0	0	0	0	0	54
10	<1 MM	15	511	76	0	40	0	0
	1 MM	0	42	0	0	0	0	0
11	<1 MM	26	2077	36	845	194	19	0
	1 MM	0	62	0	52	16	0	0
12	<1 MM	0	435	12	206	0	0	0
	1 MM	17	29	0	0	0	0	0
13	<1 MM	0	0	0	23	0	0	0
	1 MM	0	0	0	23	0	0	0
14	<1 MM	13	17	0	0	0	0	0
	1 MM	13	0	0	0	0	0	0

CONTINUATION-FISH EGGS/1000 CU M

15	<1 MM	o	o	20	22	0	0	0
	1 MM	113	38	20	0	0	0	0
16	<1 MM	o	27	0	0	0	0	0
	1 MM	0	13	31	0	0	c′	0
17	<1 MM	0	23	0	0	0	o	0
	1 MM	0	204	21	0	0	c	0
18	<1 MM	743	0	133	0	0	0	0
	1 MM	000	0	0	C	0	0	o
	2 MM	28	0	0	C	0	0	0
19	<1 MM	7852	4000	536	0	0	0	0
	1 MM	4074	240	0	0	0	0	0
	2 MM	37	0	o	0	0	0	0
20	<1 MM	107	390	130	0	0	0	0
	1 MM	813	?07	0	0	0	0	G
	2 MM	o	0	22	0	0	0	o
21	<1 MM	4556	1292	160	0	0	0	0
	1 MM	1944	167	40	C	0	0	0
22	<1 MM	4345	3481	214	0	0	0	0
	1 MM	414	407	o	0	0	c	0
23	<1 MM	6762	2267	192	0	0	0	40
	1 MM	571	167	0	0	0	0	0
24	<1 MM	18167	2680	23b	0	0	0	0
	1 MM	13722	200	o	0	0	c	0
25	<1 MM	0	2737	214	0	0	o	o
	1 MM	0	53	0	0	0	0	0
26	<1 MM	0	6056	235	0	0	0	0
	1 MM	0	389	0	0	0	0	o
27	<1 MM	0	2533	0	0	0	0	0
	1 MM	0	133	0	0	0	0	0
28	<1 MM	778	935	645	0	0	0	0
	1 MM	&33	194	32	0	0	0	0

CONTINUATION-FISH EGGS/1000 CU M

29	<1 MM	89	972	486	0	0	0	0
	1 MM	689	639	143	0	0	C	0
30	<1 MM	21	43	67	20	0	0	0
	1 MM	292	130	100	0	0	0	0
	2 MM	0	0	17	C	0	0	0
31	<1 MM	40	0	0	0	0	0	0
	1 MM	180	0	53	0	0	0	0
32	<1 MM	226	17	45	0	16	c	o
	1 MM	1145	0	0	0	0	c	o

AMMODYTES HEXAPTERUS/1000 SQ M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	LAR	18	0	0	0	0	0	0
2	LAR	33	0	0	0	0	0	0
3	LAR	245	0	0	0	0	0	0
6	LAR	42	0	0	0	0	0	0
7	LAR	306	37	0	0	0	0	0
8	LAR	1036	0	0	0	0	0	0
9	LAR	194	50	0	0	0	0	0
10	LAR	15	0	20	0	0	0	0
11	LAR	402	138	0	0	0	0	0
12	LAR	169	58	0	0	0	0	0
13	LAR	0	0	20	0	0	0	0
14	LAR	25	0	0	0	0	0	0
15	LAR	1113	94	0	0	0	0	0
16	LAR	36	27	0	0	0	0	0
17	LAR	0	45	0	0	0	0	0
18	LAR	86	0	33	0	0	0	0
20	LAR	120	98	0	0	0	0	0
21	LAR	0	442	0	0	0	0	0
22	LAR	34	0	0	0	0	0	0
23	LAR	48	0	0	0	0	0	0

CONTINUATION-AMMODYTES HEXAPTERUS/1000 CU M

28	LAR	56	0	0	0	0	0	0
29	LAR	22	0	0	0	0	0	0
30	LAR	62	0	0	0	0	0	0
31	LAR	80	26	0	0	0	0	0
32	LAR	64	0	0	0	0	0	0

CLUPEA HARENGUS PALLASI/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	LAR	0	28	0	0	0	0	0
2	LAR	0	79	0	0	0	0	0
10	LAR	0	0	20	0	0	0	0
18	LAR	0	0	0	31	0	0	0
19	LAR	0	120	462	0	0	0	0
21	LAR	0	42	0	0	0	0	0
22	LAR	0	518	0	0	0	0	0
23	LAR	0	1567	115	0	0	0	0
24	LAR	0	80	0	0	0	0	0
25	LAR	0	6421	0	0	0	0	0
26	LAR	0	3111	470	0	0	0	0
27	LAR	0	2533	0	0	0	0	0
28	LAR	0	0	161	0	0	0	0

CONTINUATION-CLUPEA HARENGUS PALLASI/1000 CU M

31	LAR	0	26	0	0	0	0	0

GADIDAE/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
8	LAR	143	0	0	0	0	0	0
11	LAR	39	0	0	0	0	0	0
12	LAR	17	0	0	0	0	0	0
14	LAR	38	0	0	0	0	0	0
15	LAR	321	0	0	0	0	0	0
	JUV	0	38	0	0	0	0	0
16	LAR	61	0	0	0	0	0	0
28	LAR	0	0	32	0	0	0	0
30	JUV	0	0	0	20	0	0	0
31	LAR	40	0	0	0	0	0	0
	JUV	0	51	0	0	0	0	0

HIPPOGLOSSOIDES ELASSODON/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 24 AG	31 AG 2 SP	20 SP 27 SP
3	LAR	7	0	0	0	0	0	0
6	LAR	70	0	0	0	0	0	0
8	LAR	143	0	0	0	0	0	0
11	LAR	13	0	0	0	0	0	0

CONTINUATION-HIPPOGLOSSOIDES ELASSODON/1000 SQ M

12	LAR	17	0	0	0	0	0	0
13	LAR	0	23	0	0	0	0	0
16	LAR	12	0	0	0	0	0	0
18	LAR	86	0	0	0	0	0	0
19	LAR	37	0	0	0	0	0	0
22	LAR	107	0	0	0	0	0	0
23	LAR	95	0	0	0	0	0	0
28	LAR	56	0	0	0	0	0	0
29	LAR	22	0	0	0	0	0	0

LIMANDA ASPERA/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	8 AG 14 AG	22 AG 24 AG	31 AG 2 SP	20 SP 27 SP
2	LAR	13	26	0	143	143	0	0
3	LAR	0	42	0	0	0	0	0
6	LAR	0	17	0	0	0	0	0
11	LAR	0	15	0	34	0	19	0
17	LAR	0	0	21	0	0	0	0
18	LAR	0	0	433	0	0	0	0
19	LAR	111	40	38	0	0	0	0
20	LAR	0	0	65	0	0	0	0
21	LAR	0	42	120	0	0	0	0

CONTINUATION-LIMANDA AS PER A/1000 CU M

22	LAR	69	111	214	0	0	0	c
23	LAR	143	400	192	0	0	0	0
24	LAR	0	0	190	0	0	0	0
26	LAR	0	64	290	0	0	0	0
29	LAR	0	139	57	30	28	0	0

MALLOTUS VILLOSUS/1000 CU M

STATION	STAGE	19 MY Y JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	LAR	b	167	0	0	500	0	0
2	LAR	13	1132	0	0	0	0	250
3	LAR	20	21	0	0	125	500	0
4	LAR	0	3450	190	4000	0	0	333
6	LAR	0	1350	299	85	167	61	0
7	LAR	0	1518	1241	67	0	156	148
8	LAR	0	1125	518	120	286	74	38
9	LAR	0	800	1362	278	53	0	27
10	LAR	0	1042	157	67	220	0	0
11	LAR	13	692	1051	86	710	38	0
12	LAR	0	246	207	143	0	143	72
13	LAti	0	Y77	960	204	191	0	0
14	LAR	0	2224	928	129	47	0	0

CONTINUATION-MALLOTUS VILLOSUS/1000 CU M

15	LAR	0	1774	490	87	35	0	0
16	LAR	0	1907	385	62	88	0	0
17	LAR	0	91	365	20	0	0	0
18	LAR	0	0	2300	125	31	0	0
19	LAR	0	4120	1692	0	0	0	0
20	LAR	0	24	783	0	0	0	0
21	LAR	0	1375	840	0	0	0	0
22	LAR	0	1333	143	0	0	0	0
23	LAR	0	733	192	0	0	0	120
24	LAR	0	520	762	0	0	0	0
25	LAR	0	263	214	0	0	0	6
26	LAR	0	3833	1470	0	0	0	0
27	LAR	0	600	0	0	0	0	0
28	LAR	0	968	2064	0	31	0	0
29	LAR	0	3722	743	152	0	0	0
30	LAR	0	478	217	102	0	0	0
31	LAR	0	282	395	50	205	0	0
32	LAR	0	1883	152	97	317	0	0

OSMERIDAE/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
2	LAR	0	53	0	0	0	0	0
3	LAR	0	21	0	0	125	0	0
4	LAR	0	850	48	1500	0	0	0
6	LAR	0	+33	52	17	0	24	12
7	LAR	0	1074	1103	0	0	62	0
8	LAR	0	1208	333	40	0	0	0
9	LAR	0	475	323	56	26	0	0
10	LAR	0	319	59	22	80	0	0
11	LAR	0	262	216	17	145	57	15
12	LAR	0	174	49	16	0	36	14
13	LAR	0	372	469	0	21	0	0
14	LAR	0	396	743	16	16	0	0
15	LAR	0	472	274	0	0	0	0
16	LAR	0	400	62	31	15	0	0
17	LAR	0	0	21	0	0	0	0
18	LAR	0	0	100	62	0	0	0
19	LAR	0	120	308	0	0	0	0
20	LAR	0	0	130	0	0	0	0
21	LAR	0	167	20	0	0	0	0
22	LAR	0	74	0	0	0	0	0

CONTINUATION-OSMERIDAE/1000 CU M

24	LAR	0	0	48	0	0	0	0
25	LAR	0	53	71	0	0	0	0
26	LAR	0	222	0	0	0	0	0
27	LAR	0	267	0	0	0	0	0
28	LAR	0	32	32	0	0	0	0
29	LAR	0	389	0	61	0	0	0
30	LAR	0	152	267	0	82	0	0
31	LAR	0	51	132	25	072	0	0
32	LAR	0	617	121	28	32	0	0

ANOMURA/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	ZOE	226	1139	0	250	500	250	333
2	ZOE	575	7684	0	1000	1143	1125	0
3	ZOE	980	271	0	0	375	833	600
	MEG	0	42	0	0	125	0	0
4	ZOE	0	250	333	0	0	0	667
5	ZOE	0	0	0	0	500	0	250
6	ZOE	1408	12533	2494	661	672	817	388
	MEG	0	0	0	51	38	12	12
7	ZOE	18939	0	0	667	0	125	259
	MEG	0	0	0	133	0	31	0
8	ZOE	49714	333	444	80	0	889	577
	MEG	0	0	148	40	0	37	0
9	ZOE	8222	5600	412	583	632	194	1297
	MEG	0	0	118	83	0	0	0
10	ZOE	4000	170	863	489	200	0	120
	MEG	0	0	0	44	0	0	20
11	ZOE	286	1908	10564	1190	5613	2811	2853
	MEG	0	0	0	86	0	19	0
12	ZOE	2508	9043	8565	4089	0	2690	2087
	MEG	69	0	195	69	0	12	0
13	ZOE	6628	372	2657	159	149	0	0
	MEG	0	279	62	91	0	0	0
14	ZOE	2126	2069	3143	145	156	0	0
	MEG	0	34	171	0	31	0	0
15	ZOE	2189	2019	2745	0	35	0	0
	MEG	0	19	76	43	0	0	0

CONTINUATION-ANOMORA/1000 CU M

16	ZOE	122	213	354	438	15	0	0
	MEG	0	- o	136	94	0	C	0
17	ZOE	0	1000	3872	120	0	0	0
	MEG	0	o	85	0	0	0	o
18	ZOE	5086	19200	375	2500	0	0	0
	MEG	o	0	533	0	31	0	0
19	ZOE	3111	1640	3577	0	0	0	0
20	ZOE	1227	1366	1739	0	0	0	0
	MEG	o	0	22	0	G	0	0
21	ZLE	1722	4167	920	0	o	0	40
22	ZOE	9793	4704	571	0	0	0	0
	MEG	0	0	0	0	0	o	64
23	ZOE	4428	4533	1115	0	0	c	80
	MEG	0	0	0	0	0	0	40
24	ZOE	1500	3560	2095	0	0	c	o
25	ZOE	0	2632	71	0	0	0	0
26	ZOE	0	2556	116	0	0	0	0
27	ZOE	0	1000	c	0	0	0	0
28	ZOE	4083	23?42	3226	900	4344	0	0
	MEG	0	0	129	0	31	0	0
29	ZOE	1333	333	3086	1364	1714	0	0
	MEG	0	0	0	91	o	0	0
30	ZOE	5583	851	867	388	184	0	0
31	ZOE	960	0	526	425	462	0	0
	MEG	0	26	105	0	o	0	0
32	ZOE	1290	300	2061	930	143	0	0
	MEG	0	0	242	14	0	0	0

BRACHYURA/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	ZOE	245	1083	0	2375	0	0	0
	MEG	3	0	0	0	0	0	0
2	ZOE	1804	2842	0	1143	714	125	0
3	ZOE	1510	188	0	0	500	1167	0
4	ZOE	0	950	667	2000	10500	0	0
	MEG	0	150	333	0	0	0	0
5	ZOE	0	0	0	0	23000	0	0
6	ZOE	4225	9867	1039	356	231	207	12
	MEG	0	267	208	85	13	0	0
7	ZOE	75755	2370	1103	333	0	781	0
	MEG	1959	0	0	10667	0	0	0
8	ZOE	7428	1000	2370	80	95	407	38
	MEG	0	0	7852	2840	0	0	0
9	ZOE	6222	38400	0	28	1474	97	0
	MEG	0	0	412	1250	105	0	27
10	ZOE	5539	340	863	44	700	0	0
	MEG	121	0	803	1778	0	0	0
11	ZOE	312	985	3077	172	581	453	74
	MEG	0	0	1026	241	0	0	15
12	ZOE	5559	12522	2536	111	0	83	43
	MEG	0	0	5854	511	0	0	14
13	ZOE	12690	4372	245	0	694	0	0
	MEG	276	0	9061	1068	0	0	0
14	ZOE	4911	2362	114	16	172	0	0
	MEG	0	17	1028	339	0	0	0
15	ZOE	4415	1283	78	0	263	0	0
	MEG	38	19	157	109	0	0	0

CONTINUATION-BRACHYURA/1000 CU M

16	ZOE	3565	1240	77	0	206	0	0
	MEG	0	0	123	875	0	0	0
17	ZOE	0	1318	213	20	0	0	0
	MEG	0	0	0	100	0	0	0
18	ZOE	3600	0	19200	594	531	0	0
	MEG	0	0	533	0	0	0	0
19	ZOE	481	300	2000	0	0	0	0
	MEG	0	0	0	0	0	0	32
20	ZOE	1920	976	217	0	0	0	0
	MEG	0	49	43	0	0	0	0
21	ZOE	500	19583	4440	0	0	0	0
22	ZOE	1724	1741	4107	0	0	0	0
	MEG	69	0	0	0	0	0	0
23	ZOE	1619	1733	5269	0	0	0	80
	MEG	0	67	0	0	0	0	0
24	ZOE	111	3920	9476	0	0	0	45
	MEG	0	40	95	0	0	0	0
25	ZOE	0	53	0	0	0	0	0
	MEG	0	0	71	0	0	0	0
26	ZOE	0	500	59	0	0	0	0
27	ZOE	0	467	0	0	0	0	0
28	ZOE	1417	17548	5419	433	62	0	0
	MEG	0	1032	256	67	0	0	0
29	ZOE	289	139	457	152	714	0	0
	MEG	0	0	0	31	0	0	0
30	ZOE	5250	170	450	41	102	0	0
	MEG	0	0	83	41	0	0	0
31	ZOE	6080	923	632	0	102	0	0
	MEG	0	0	210	15	0	0	0

CONTINUATION-BRACHYURA/1000 CU M

32	ZOE	1290	533	1394	0	524	0	0
	MEG	0	0	788	69	0	0	0

CANCER MAGISTER/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 8 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	II	6	0	0	0	0	0	0
2	II	0	421	0	0	0	0	0
3	I	53	0	0	0	0	0	0
	II	26	83	0	0	0	0	0
4	II	0	150	0	0	0	0	0
6	I	56	0	0	0	0	0	0
	II	0	800	208	0	0	0	0
7	II	0	592	552	0	0	0	0
8	I	6286	0	0	0	0	0	0
	II	0	2333	296	0	0	37	0
9	I	667	0	59	0	0	0	0
	II	0	8000	1176	0	0	0	0
	III	0	0	745	0	0	0	0
	V	0	0	0	0	105	0	0
10	II	0	340	78	0	0	0	0
	III	0	0	314	0	0	0	0
	MEG	0	0	0	0	60	0	0
11	II	0	308	1026	0	0	0	0
	III	0	0	308	0	0	0	0
	V	0	0	0	0	0	19	0
12	I	542	0	0	0	0	0	0
13	II	0	2319	0	0	0	0	0
	III	0	232	0	0	0	0	0

CONTINUATION-CANCER MAGISTER/1000 CU M

14	I	51	0	0	0	0	0	0
	V	0	0	0	0	16	0	0
15	II	0	19	0	0	0	0	0
16	II	0	0	108	0	0	0	0
	III	0	0	77	31	0	0	0
	IV	0	0	31	0	0	0	0
	V	0	0	0	31	0	0	0
17	II	0	45	340	0	0	0	0
	III	0	0	42	0	0	0	0
19	II	148	0	0	0	0	0	0
	III	0	0	38	0	0	0	0
20	II	53	488	0	0	6	0	0
21	II	0	167	80	0	0	0	0
22	II	207	333	0	0	0	0	0
	III	0	37	0	0	0	0	0
23	II	95	33	0	0	0	0	0
24	II	0	80	0	0	0	0	0
26	II	0	56	0	0	0	0	0
28	II	83	0	258	0	0	0	0
29	II	44	56	0	0	0	0	0
30	II	0	0	17	0	0	0	0
	III	0	0	33	0	0	0	0
31	II	640	0	105	0	0	0	0
32	II	774	0	364	0	0	0	0
	III	0	0	303	0	0	0	0
	V	0	0	0	0	16	0	0
	MEG	0	0	0	0	16	0	0

CANCER SPP/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	8 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	I	154	306	0	0	220	0	0
	III	0	0	0	375	0	0	0
	ZOE	6	0	0	0	0	0	0
2	I	52	3684	0	143	0	0	0
	II	0	526	0	143	0	0	0
	V	0	0	0	0	143	125	0
	ZOE	26	0	0	0	0	0	0
3	I	1139	854	0	0	0	0	0
	II	0	396	0	0	0	0	0
	III	0	0	0	0	0	167	0
	V	0	0	0	0	250	0	0
	ZOE	53	0	0	0	0	0	0
4	I	0	13250	667	0	0	0	0
	II	0	2550	2238	0	0	0	333
	III	0	0	762	0	0	0	0
	V	0	0	0	0	1000	0	0
5	I	0	0	0	0	0	667	0
6	I	1465	61333	3948	17	0	24	0
	II	0	36000	18494	0	13	12	0
	III	0	533	1662	169	13	36	0
	IV	0	0	0	644	0	12	0
	V	0	0	0	136	26	305	0
	MEG	0	0	0	0	26	256	94
7	I	0	73481	14345	200	0	0	37
	II	0	4148	11310	67	0	31	185
	III	0	592	3310	333	0	31	0
	IV	0	0	0	2200	0	62	0
	V	0	0	0	1067	0	281	?4
	ZOE	57469	0	0	0	0	0	0
	MEG	0	0	0	0	0	719	0
8	I	66286	32667	3556	0	0	0	0
	II	0	5333	4296	0	48	0	0
	III	0	333	2074	560	95	0	0
	IV	0	0	0	1160	428	0	0
	V	0	0	0	160	3048	148	0
	ZOE	3428	0	0	0	0	0	0
	MEG	0	0	0	0	381	111	38

CONTINUATION-CANCER SPP/1000 CU M

9	I	14444	21600	1235	0	210	0	0
	II	0	3200	1824	0	0	0	0
	III	0	800	353	111	0	0	0
	IV	0	0	0	139	210	0	27
	V	0	0	0	83	5053	161	27
	ZOE	1111	0	353	0	0	0	0
	MEG	0	0	0	0	1579	194	405
10	I	16727	3511	392	22	0	0	20
	II	0	532	2588	0	0	0	20
	III	0	0	3529	44	0	0	0
	IV	0	0	0	289	60	0	0
	V	0	0	0	178	880	0	0
	MEG	0	0	0	0	820	0	300
11	I	779	4862	2769	121	0	0	15
	II	0	2954	23897	138	0	19	44
	III	0	62	8102	345	0	19	44
	IV	0	0	0	586	129	19	0
	V	0	0	0	155	903	189	15
	MEG	0	0	0	0	0	243	29
12	I	2712	13449	2927	44	0	12	0
	II	0	7420	7220	67	0	12	0
	III	0	928	4488	267	0	12	0
	IV	0	0	0	2467	0	0	29
	V	0	0	0	578	0	83	43
	MEG	0	0	0	0	0	83	246
13	I	0	12837	0	23	0	0	0
	II	0	279	1959	23	0	0	0
	III	0	0	1143	68	0	0	0
	IV	0	0	0	136	0	0	0
	V	0	0	0	91	85	0	0
	ZOE	8276	0	0	0	0	0	0
	MEG	0	0	0	0	276	0	0
14	I	1975	1448	228	32	0	0	0
	II	0	0	686	48	16	0	0
	III	0	0	857	113	16	0	0
	IV	0	0	114	81	31	0	0
	V	0	0	57	64	172	0	0
	ZOE	51	0	0	0	0	0	0
	MEG	0	0	57	0	62	0	0

CONTINUATION-CANCER SPP/1000 CU M

15	I	377	340	1882	67	0	0	0
	II	0	151	4470	87	0	0	0
	III	0	0	3216	239	0	0	0
	IV	0	0	157	370	35	0	0
	V	0	0	0	22	333	0	0
	ZOE	38	0	0	0	0	0	0
	MEG	0	0	0	0	175	0	0
16	I	24	1707	246	0	0	0	0
	II	24	53	677	250	0	0	0
	III	0	13	554	812	0	0	0
	IV	0	0	46	5000	0	0	0
	V	0	0	0	312	15	0	0
	ZOE	0	0	62	0	0	0	0
	MEG	0	0	15	31	88	0	0
17	I	0	4591	2468	0	0	0	0
	II	0	500	1872	280	0	0	0
	III	0	0	340	220	0	0	0
	IV	0	0	0	460	0	0	0
	V	0	0	0	20	0	0	0
	ZOE	0	0	213	0	0	0	0
18	I	286	0	5600	125	0	0	0
	II	228	0	1067	438	0	0	0
	III	0	0	4267	469	0	0	0
	IV	0	0	0	781	62	0	0
	V	0	0	0	94	62	0	0
	MEG	0	0	0	0	62	0	0
19	I	185	80	500	0	0	0	0
	II	37	0	269	0	0	0	0
	III	0	0	154	0	0	0	0
	MEG	0	0	0	0	0	0	32
20	I	147	7024	1870	0	0	0	0
	II	0	486	2043	0	0	0	0
	III	0	0	739	0	0	0	0
	IV	0	0	22	0	0	0	0
21	I	0	417	1800	0	0	0	0
	II	0	0	40	0	0	0	0
	III	0	0	80	0	0	0	0
	MEG	0	0	0	0	0	0	80

CONTINUATION-CANCER SPP/1000 CU M

22	I	0	185	36	0	0	0	0
	II	0	0	30	0	0	0	0
	III	0	0	250	0	0	0	0
	ZOE	276	0	0	0	0	0	32
23	I	48	0	115	0	0	0	0
	II	0	33	0	0	0	0	0
	MEG	0	0	0	0	0	0	40
24	I	56	40	619	0	0	0	0
	II	0	0	286	0	0	0	0
25	II	0	0	71	0	0	0	0
27	I	0	67	0	0	0	0	0
28	I	361	36129	1161	0	0	0	0
	II	0	72258	2839	33	0	0	0
	III	0	4129	1290	533	62	0	0
	IV	0	0	0	633	94	0	0
	V	0	0	0	300	31	0	0
	MEG	0	0	0	0	31	0	0
29	I	200	1778	3086	0	28	0	0
	II	0	3861	7657	273	0	0	0
	III	0	28	2971	424	0	0	0
	IV	0	0	0	485	86	0	0
	V	0	0	0	212	0	0	0
	MEG	0	0	0	0	114	0	0
30	I	417	7826	2600	0	0	0	0
	II	0	10553	3650	61	0	0	0
	III	0	170	433	224	0	0	0
	IV	0	0	0	286	20	0	0
	V	0	0	0	224	184	0	0
	MEG	0	0	0	0	102	0	0
31	I	14720	5026	1684	0	77	0	0
	II	0	1769	16526	25	77	0	0
	III	0	0	3156	50	103	0	0
	IV	0	0	0	300	51	0	0
	V	0	0	0	75	667	0	0
	ZOE	0	51	0	0	0	0	0
	MEG	0	0	0	25	128	0	0

CONTINUATION-CANCER SPP/1000 CU M

32	I	22064	3000	909	0	32	0	0
	II	0	1200	5333	0	16	0	0
	III	0	33	3273	0	16	0	0
	IV	0	0	0	28	32	0	0
	V	0	0	0	69	1508	0	0
	MEG	0	0	0	28	302	0	0

CHIONOECETES BAIRDI/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	I	390	0	0	0	0	0	0
2	I	6458	0	0	0	0	0	0
3	I	4185	0	0	0	0	0	0
5	MEG	0	0	0	0	500	0	0
6	I	1127	0	0	0	0	0	0
7	I	5878	0	0	0	0	0	0
	II	653	0	0	0	0	0	0
8	I	44571	1000	0	0	0	0	0
	II	0	333	0	0	0	0	0
9	I	17556	800	0	0	0	0	0
	II	0	5000	0	0	0	0	0
10	I	0	21	0	0	0	0	0
11	I	351	0	0	0	0	0	0
12	I	0	464	0	0	0	0	0
	II	68	0	0	0	0	0	0
14	II	51	0	0	0	0	0	0
	MEG	51	0	0	0	0	0	0

CONTINUATION-CHIONOECETES BAIRDI/1000 CU M

15	I	1509	0	0	0	0	0	0
	MEG	73	0	0	0	0	0	0
16	I	0	160	0	0	0	0	0
	II	0	40	46	0	0	0	0
	MEG	49	0	0	0	0	0	0
20	I	187	0	0	0	0	0	0
22	I	138	0	0	0	0	0	0
24	I	56	0	0	0	0	0	0
28	I	556	0	0	0	0	0	0
29	I	956	0	0	0	0	0	0
30	I	333	0	0	0	0	0	0
31	I	5440	0	0	0	0	0	0
32	I	1032	0	0	0	0	0	0

PARALITHODES CAMTSCHATICA/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	III	15	0	0	0	0	0	0
	IV	21	0	0	0	0	0	0
3	III	24	0	0	0	0	0	0
	IV	26	0	0	0	0	0	0
7	III	653	0	0	0	0	0	0
	IV	1959	0	0	0	0	0	0
8	III	2857	0	0	0	0	0	0
	IV	571	0	0	0	0	0	0
9	III	222	0	0	0	0	0	0

CONTINUATION-PARALITHODES CAMTSCHATICA/1000 CU M

10	III	364	0	0	0	0	0	0
	IV	121	0	0	0	0	0	0
11	III	13	0	0	0	0	0	0
	IV	65	0	0	0	0	0	0
12	IV	339	0	0	0	0	0	0
13	II	276	0	0	0	0	0	0
	III	276	0	0	0	0	0	0
	IV	276	0	0	0	0	0	0
14	MEG	51	0	0	0	0	0	0
10	III	49	0	0	0	0	0	0
	IV	24	0	0	0	0	0	0
20	II	13	0	0	0	0	0	0
22	III	69	0	0	0	0	0	0
	IV	0	37	0	0	0	0	0
23	III	48	0	0	0	0	0	0
28	MEG	56	0	0	0	0	0	0
30	MEG	83	0	0	0	0	0	0
31	IV	320	0	0	0	0	0	0

PANDALOPSIS DISPAR/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
6	I	0	17	0	0	0	0	0
	II	0	17	0	0	0	0	0
7	II	41	0	0	0	0	0	0
9	I	56	0	0	0	0	0	0
	II	56	0	0	0	0	0	0
	III	56	0	0	0	0	0	0
10	I	0	21	0	0	0	0	0
12	I	17	0	0	22	0	0	0
15	II	0	19	0	0	0	0	0
31	III	40	0	0	0	0	0	0

PANDALUS BOREALIS/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	II	24	0	0	0	0	0	0
	III	133	0	0	0	0	0	0
	IV	24	0	0	0	0	0	0
2	I	26	0	0	0	0	0	0
	II	13	0	0	0	0	0	0
	III	26	0	0	0	0	0	0
3	I	26	0	0	0	0	0	0
	II	212	0	0	0	0	0	0
	III	530	0	0	0	0	0	0
	IV	132	21	0	0	0	0	0
6	IV	113	100	0	0	0	0	0
8	III	36	0	0	0	0	0	0
	IV	607	0	0	0	0	0	0

CONTINUATION-PANDALUS BOREALIS/1000 CU M

9	IV	556	0	0	0	0	9	0
11	IV	532	15	13	0	0	0	0
	V	13	0	0	0	0	0	0
12	IV	34	0	0	0	0	0	G
13	IV	103	23	0	0	0	0	0
14	V	51	0	0	0	0	0	G
15	IV	0	38	59	0	0	0	0
16	IV	12	0	0	16	0	0	0
17	IV	0	136	0	0	0	c	0
20	IV	0	171	435	0	0	o	0
22	IV	0	74	0	0	0	0	0
23	Iv	0	133	0	0	0	0	0
26	Iv	0	111	0	0	0	0	0
28	IV	0	194	0	0	o	0	0
29	IV	0	28	0	0	0	0	0
30	V	0	22	0	0	0	0	0

PANDALUS DANAE/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
3	II	53	o	0	0	o	c	o
16	V	0	40	0	0	0	0	0
25	Al	0	105	0	0	0	0	0

CONTINUATION-PANDALUS DANAE/1000 CU M

20	III	0	56	0	0	0	0	0

PANDALUS GONIURUS/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	II	48	0	0	0	0	0	0
	III	290	0	0	0	0	0	0
2	I	52	0	0	0	0	0	0
	II	65	0	0	0	0	0	0
	III	65	0	0	0	0	0	0
3	I	106	0	0	0	0	0	0
	II	159	0	0	0	0	0	0
	III	138	0	0	0	0	0	0
6	III	56	0	0	0	0	0	0
	IV	113	0	0	0	0	0	0
7	III	163	0	0	0	0	0	0
	IV	163	0	0	0	0	0	0
8	III	178	0	0	0	0	0	0
	IV	3000	0	0	0	0	0	0
9	III	167	0	0	0	0	0	0
	IV	1333	0	0	0	0	0	0
	V	56	0	0	0	0	0	0
11	III	104	0	0	0	0	0	0
	IV	792	0	0	0	0	0	0
12	III	51	0	0	0	0	0	0
	IV	85	0	0	0	0	0	0
	V	0	14	0	0	0	0	0
13	IV	34	0	0	0	0	0	0
14	IV	13	0	0	0	0	0	0

CONTINUATION-PANDALUS GONIURUS/1000 CU M

15	II	19	0	0	0	0	0	0
	III	170	0	0	0	0	0	0
	IV	113	0	0	0	0	0	0
17	V	0	23	0	0	0	0	0
18	IV	28	0	0	0	0	0	0
19	III	37	0	0	0	0	0	0
	IV	74	0	0	0	0	0	0
	V	0	80	0	0	0	0	0
20	II	13	0	0	0	0	0	0
	III	13	0	0	0	0	0	0
	IV	80	171	0	0	0	0	0
	V	0	341	0	0	0	0	0
21	II	56	0	0	0	0	0	0
	III	56	0	0	0	0	0	0
	IV	167	0	0	0	0	0	0
	V	0	0	40	0	0	0	0
22	III	138	0	0	0	0	0	0
	IV	414	74	0	0	0	0	0
	V	0	222	0	0	0	0	0
23	IV	381	0	0	0	0	0	0
	V	0	33	77	0	0	0	0
28	V	0	161	64	0	0	0	0
29	IV	22	0	0	0	0	0	0
30	IV	104	0	0	0	0	0	0
	V	0	43	17	0	0	0	0

PANDALUS HYPSINOTUS/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
4	II	0	0	48	0	0	0	0
6	VI	0	0	26	0	0	0	0
12	VA	0	0	24	0	0	0	0
29	III	0	0	28	0	0	c	0

PANDALUS MONTAGUI TRIDENS/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
16	III	12	0	0	G	0	0	0

PANDALUS STENOLEPIS/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
13	I	0	70	0	0	0	0	0
	II	0	0	20	0	0	0	0
	III	0	0	102	0	0	0	0
	IV	0	0	41	0	0	0	0
14	I	0	17	0	0	0	0	0
15	III	0	0	20	0	0	0	0
16	II	0	13	15	0	0	0	0
	III	0	13	15	0	0	0	0
	IV	0	13	0	16	0	0	0
32	I	0	17	0	0	0	0	0

APPENDIX H

Density per 1000 cubic meters for 1978 neuston net samples.

FISH EGGS/1000 CU M

STATION	SIZE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
1	<1 MM				0	901	155	0
	1 MM				0	14	0	0
2	<1 MM				0	56	0	0
3	<1 MM				0	155	98	141
4	<1 MM				0	12507	422	14
	3 MM				0	0	14	0
5	<1 MM				0	14	14	0
6	<1 MM				0	42	70	14
7	<1 MM				0	0	2211	0
	1 MM				0	0	56	0
8	<1 MM				0	1338	620	0
	1 MM				0	14	8	0
	2 MM				0	0	0	14
9	<1 MM				0	662	14	0
	1 MM				0	14	0	0
10	<1 MM				0	986	0	0
	1 MM				0	28	0	0
11	<1 MM				0	662	1479	56
	1 MM				0	0	14	0
12	<1 MM				0	0	28	0
28	<1 MM				28	0	0	0
31	<1 MM				0	14	0	0
32	<1 MM				28	113	0	0
	1 MM				0	14	0	0

LIMANDA ASPERA/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
4	LAR				0	0	14	0

MALLOTUS VILLOSUS/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
2	LAR				0	0	0	14
4	LAR				0	0	366	0
7	LAR				0	0	141	0
8	LAR				0	0	0	70
11	LAR				0	14	0	0
14	LAR				0	56	0	0
22	LAR				0	0	0	14
28	LAR				14	0	0	0

OSMERIDAE/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
4	LAR				0	0	183	0
7	LAR				0	0	42	70
8	LAR				0	42	0	56
9	LAR				0	70	14	0

CONTINUATION-OSMERIDAE/1000 CU M

14	LAR	0	422	0	0
22	LAR	0	0	0	14
23	LAR	0	0	0	70
31	LAR	0	14	0	0
32	LAR	28	0	0	0

ANOMURA/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	8 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
A	MEG				0	14	14	0
3	ZOE				0	0	C	14
	MEG				0	14	0	28
4	ZOE				0	0	0	14
	MEG				0	98	0	0
5	MEG				0	0	0	14
o	MEG				0	28	0	0
i'	ZOE				0	0	0	14
AA	MEG				0	14	0	0
19	MEG				0	0	0	14
23	MEG				0	0	0	98
31	ZOE				14	0	0	0
	MEG				28	0	0	0
32	ZOE				225	0	0	0

BRACHYURA/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	8 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
4	ZOE				0	0	0	14
10	ZOE				0	4	0	0
28	ZOE				33	14	0	0
	MEG				133	0	0	0
30	MEG				98	0	0	0

CONTINUATION-BRACHYURA/1000 CU M

31	MEG				84	0	0	0
32	MEG				169	0	0	0

CANCER MAGISTER/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
6	MEG				0	42	0	0
9	V				0	0	14	0
11	MEG				0	14	0	0
12	MEG				0	0	14	0
14	MEG				0	56	0	G
15	MEG				0	14	0	0
31	MEG				14	0	0	0
32	V				28	0	0	0
	MEG				70	0	0	0

CANCER SPP/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
4	I				0	0	14	0
	II				0	0	0	28
	V				0	873	0	0
	MEG				0	422	254	0
5	I				0	14	0	0
0	MEG				0	0	0	14

CONTINUATION-CANCER SPP/1000 CU M

7	I	0	0	56	0
	II	0	0	28	0
	III	0	0	14	0
	IV	0	0	42	0
	V	0	0	84	0
	MEG	0	0	0	183
8	IV	0	0	0	14
	V	0	14	14	0
	MEG	0	42	14	0
9	I	0	0	20	0
	II	0	0	14	0
	III	0	0	42	0
	IV	0	0	14	0
	V	0	0	28	0
	MEG	0	14	14	127
11	IV	0	42	0	0
	V	0	1507	0	0
	MEG	0	282	0	0
12	MEG	0	0	56	14
20	V	0	0	0	14
21	MEG	0	0	0	56
22	MEG	0	0	0	28
23	MEG	0	0	0	42
24	MEG	0	0	0	42
28	I	33	0	0	0
	II	33	0	0	0
	MEG	0	14	0	0
29	V	14	0	0	0
30	V	28	0	0	0
	MEG	14	0	0	0

CONTINUATION-CANCER SPP/1000 CU M

31	III				0	14	0	0
	IV				23	0	0	0
	V				141	0	0	0
	MEG				14	0	0	0
32	I				14	0	0	0
	IV				282	0	0	0
	V				507	0	0	0
	MEG				338	0	0	0

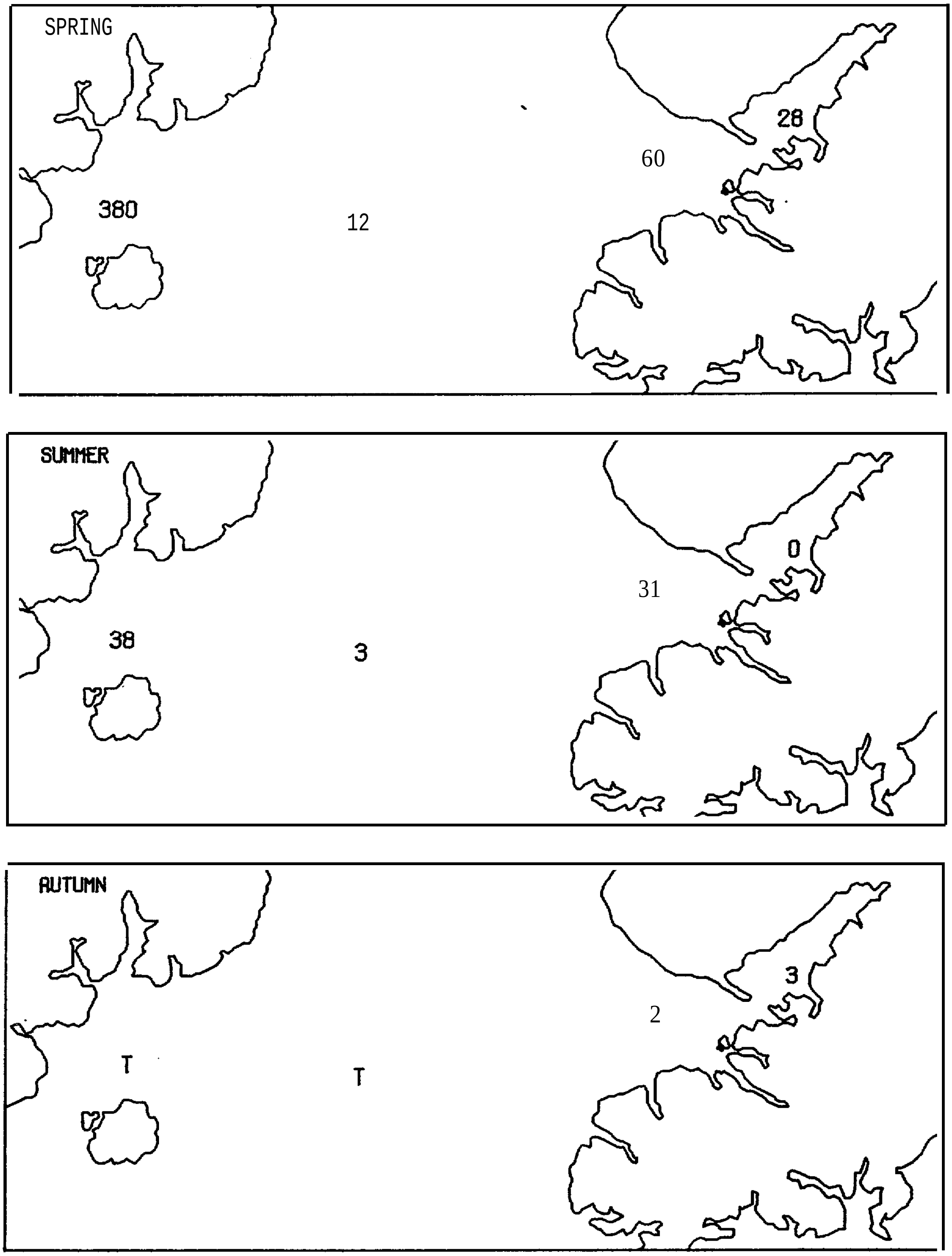
CHIONOECETES BAIRDI/1000 CU M

STATION	STAGE	19 MY 9 JN	26 JN 6 JL	11 JL 16 JL	6 AG 14 AG	22 AG 29 AG	31 AG 2 SP	20 SP 27 SP
32	MEG				141	0	0	0

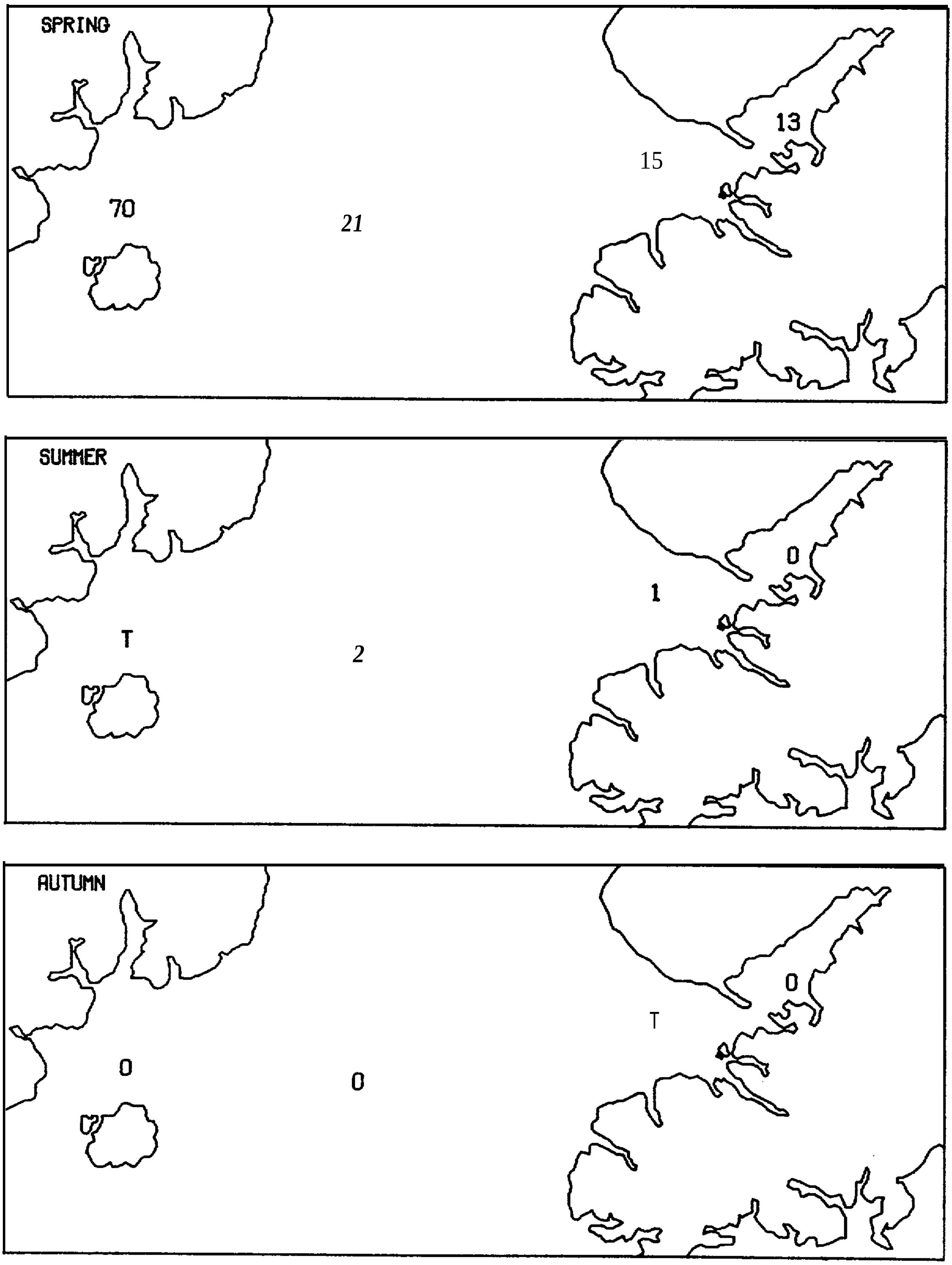
APPENDIX I

Density distributions per 10 square meters for three seasons in four areas, 1978.

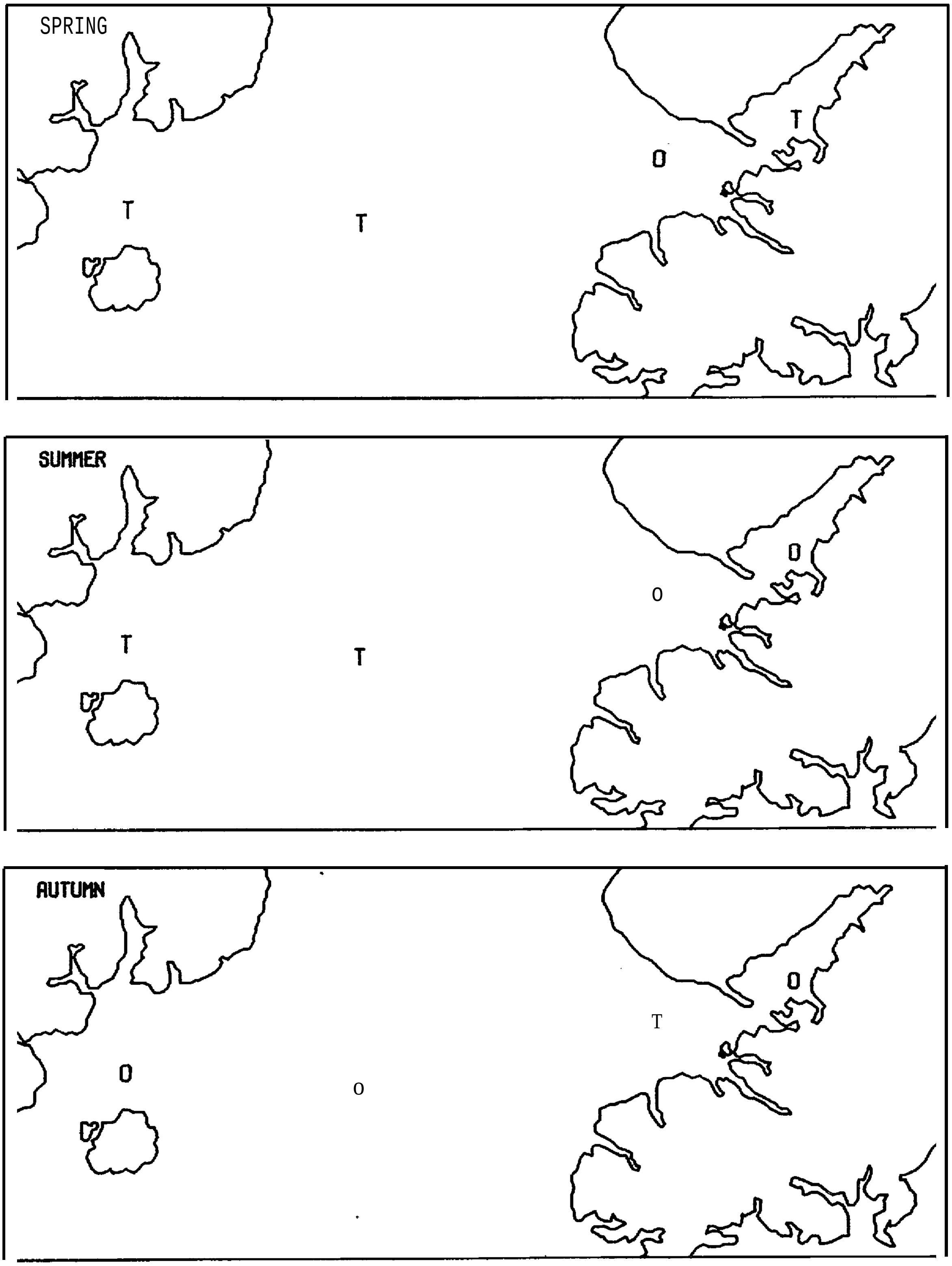
FISH EGGS
<1MM DIAM/10 SQ M



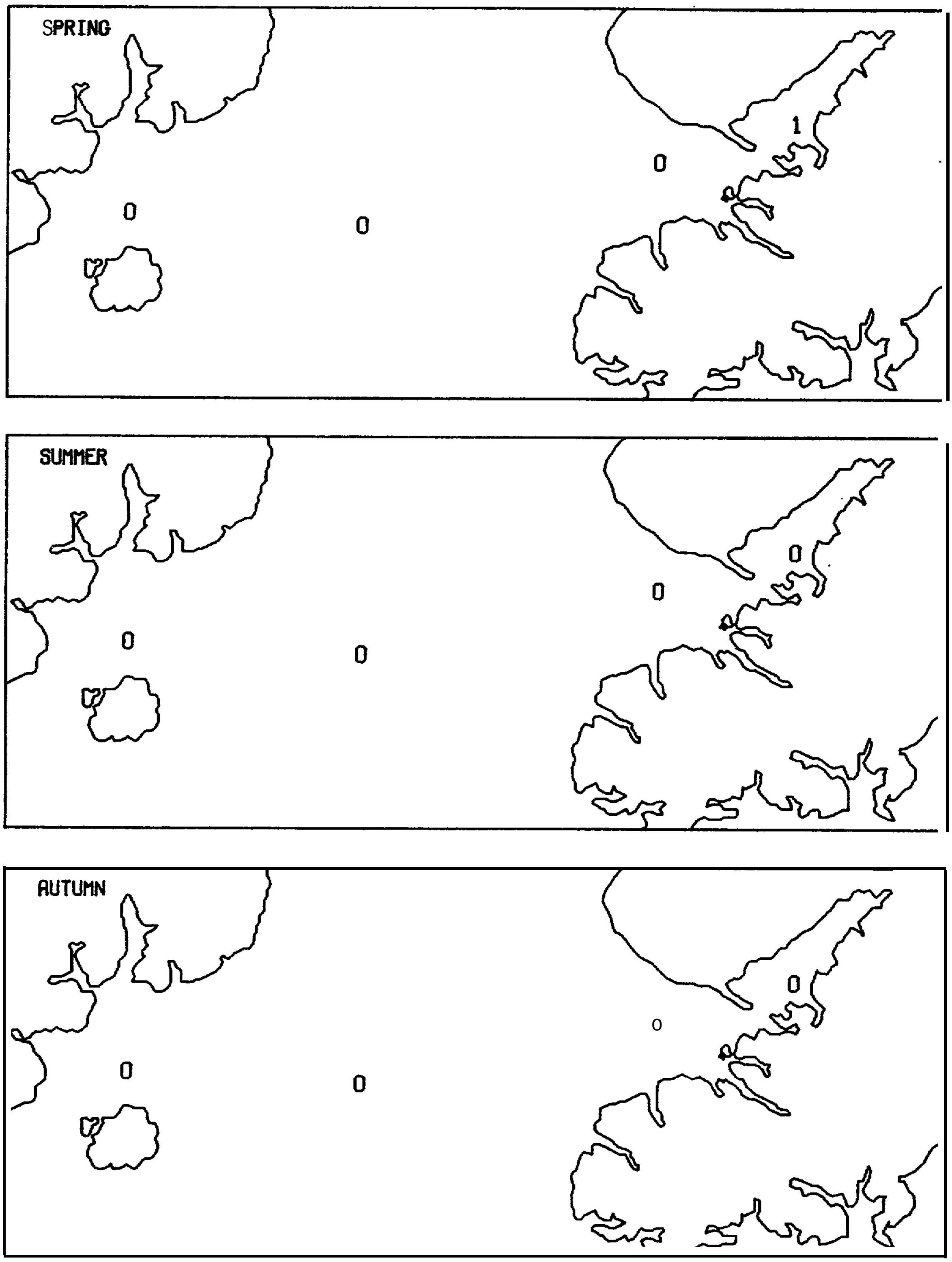
FISH EGGS
1MM IIIW'V1O SQ M



FISH EGGS
2MM DIAM/10 SQ M

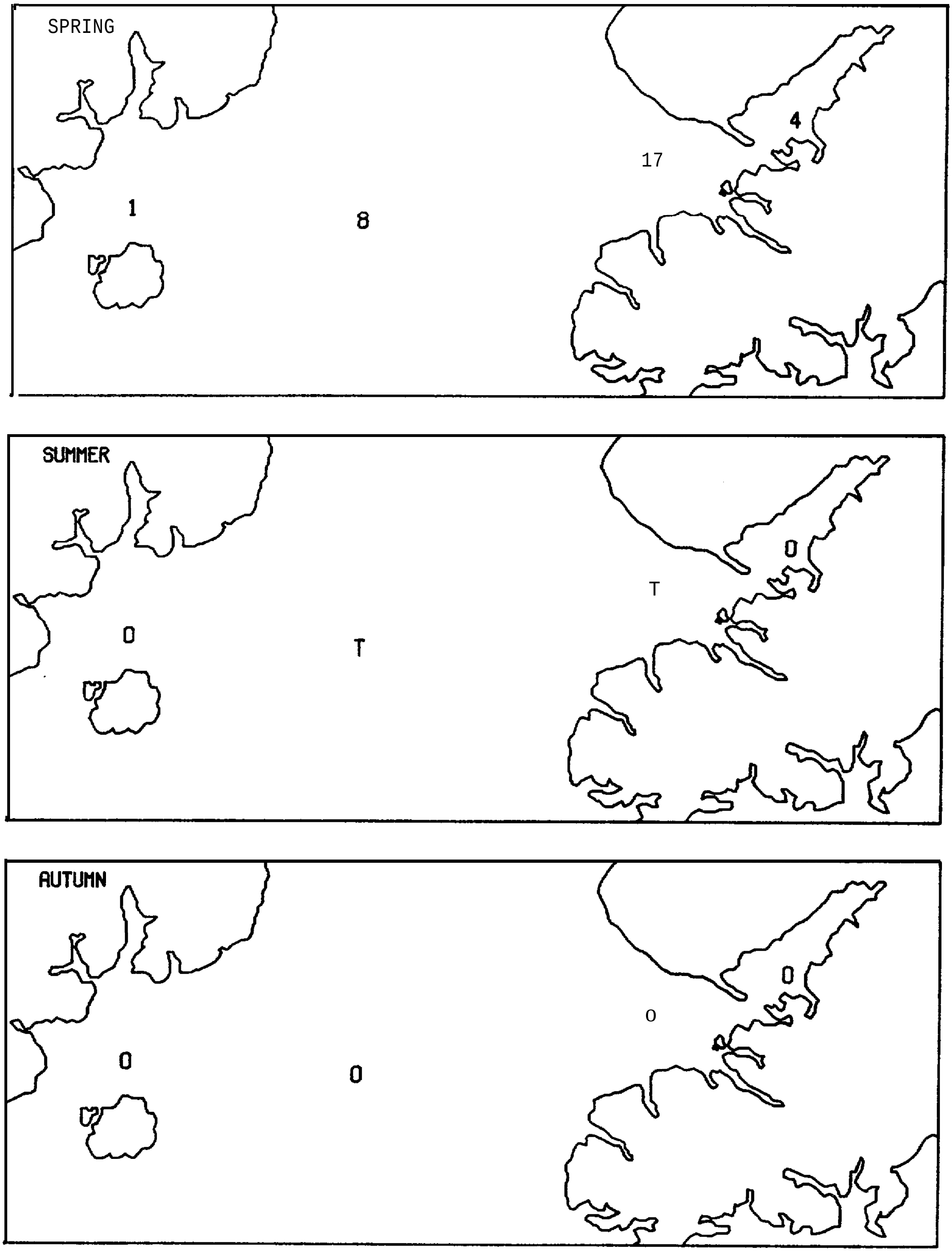


FISH EGGS
3MM DIAM/10 SQ M

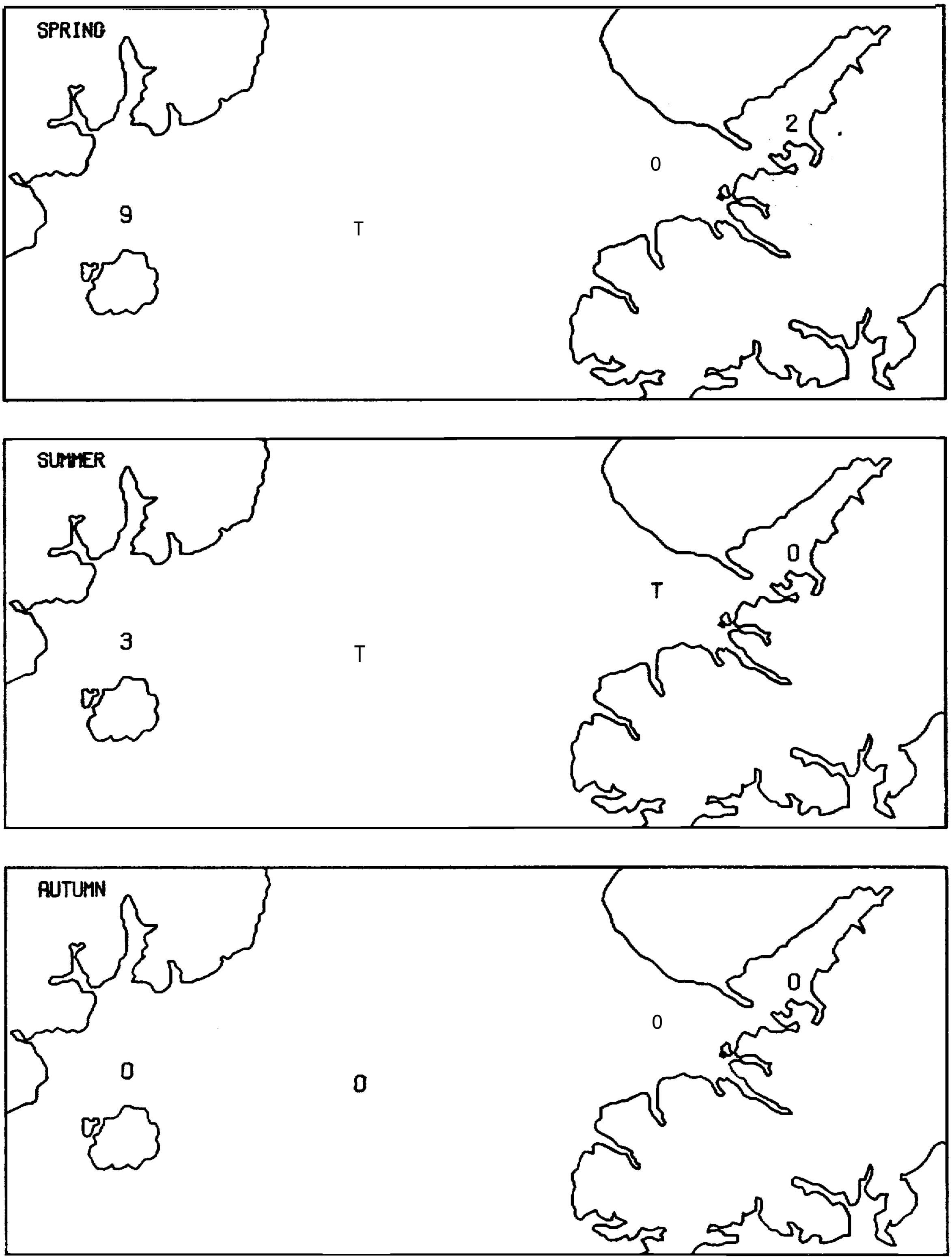


AMMODYTES HEXAPTERUS

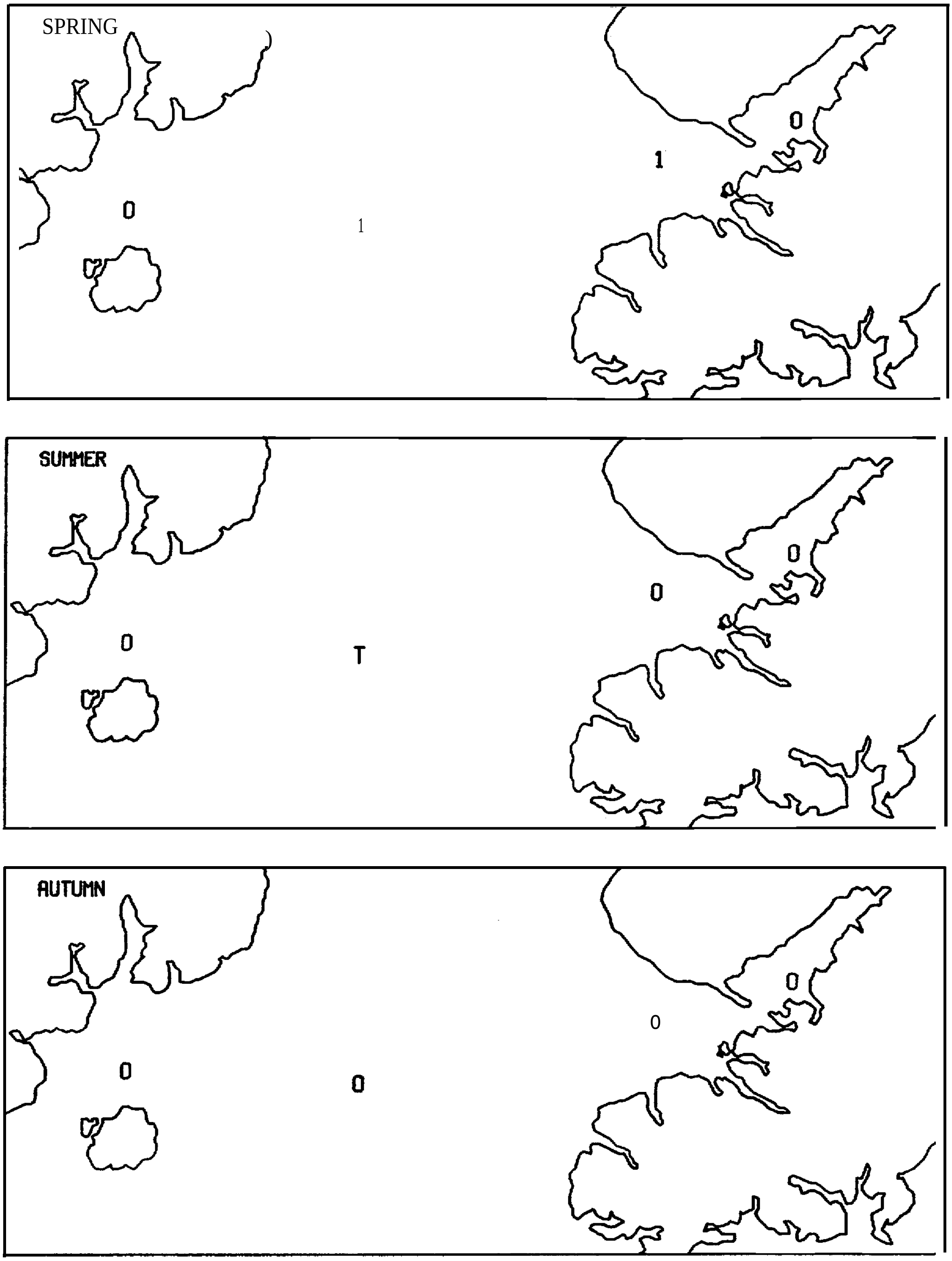
LRRVW10 SQM



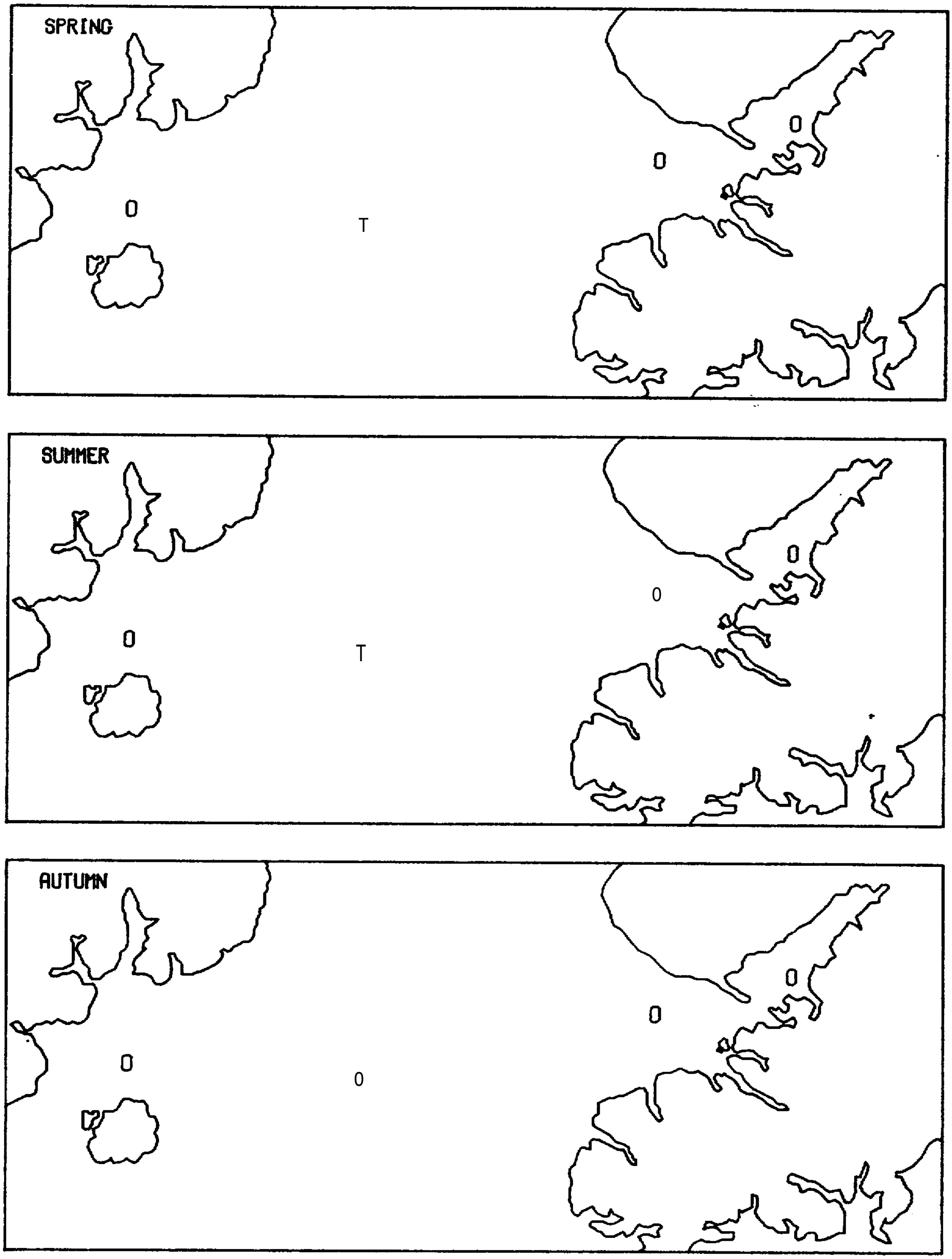
CLUPEA HARENGUS PALLASI
LARVA/10 SQ M



GADIDAE
LARVA/10 SQ M

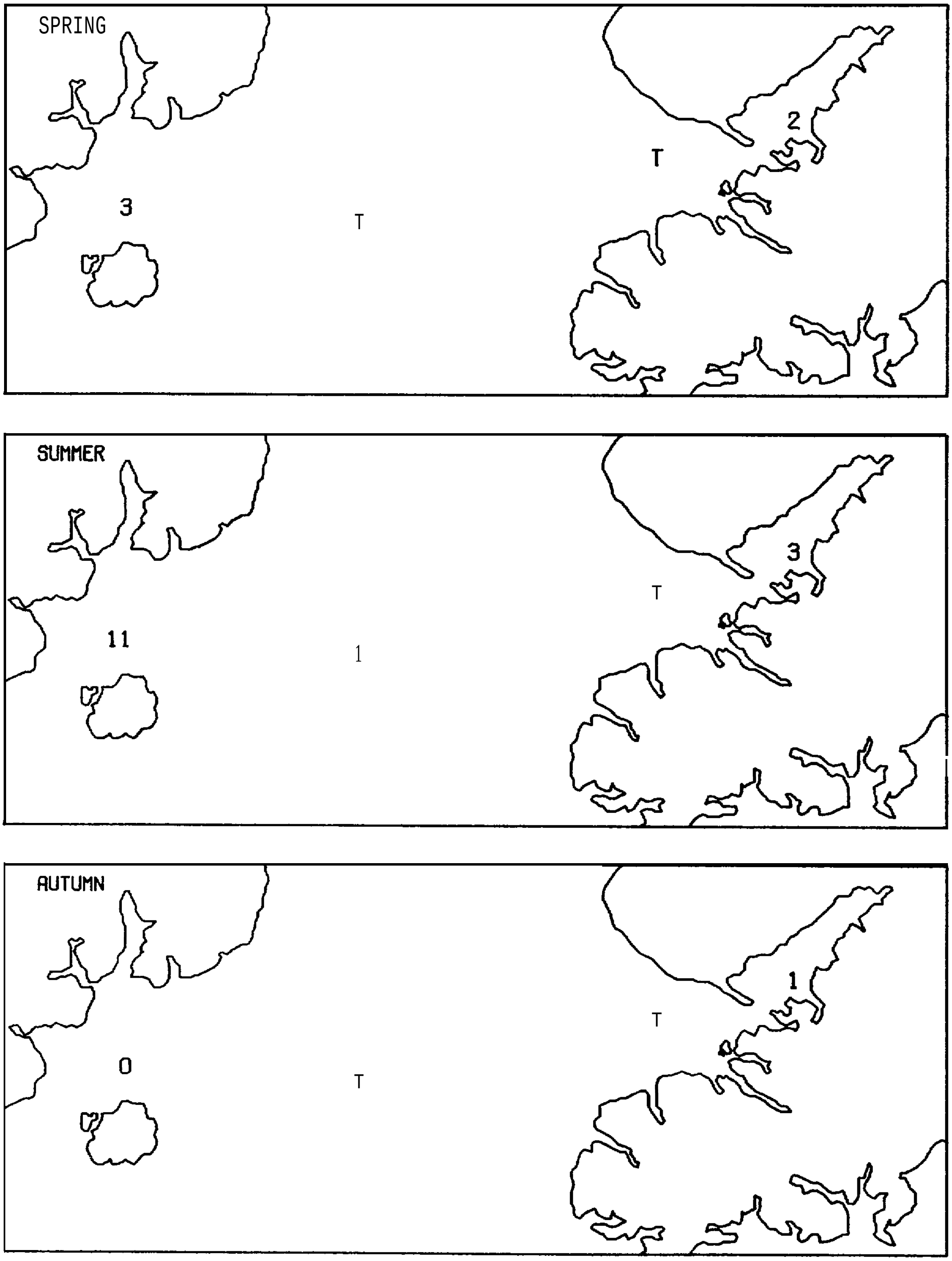


GADIDAE
JUVENILE/10 SQ M

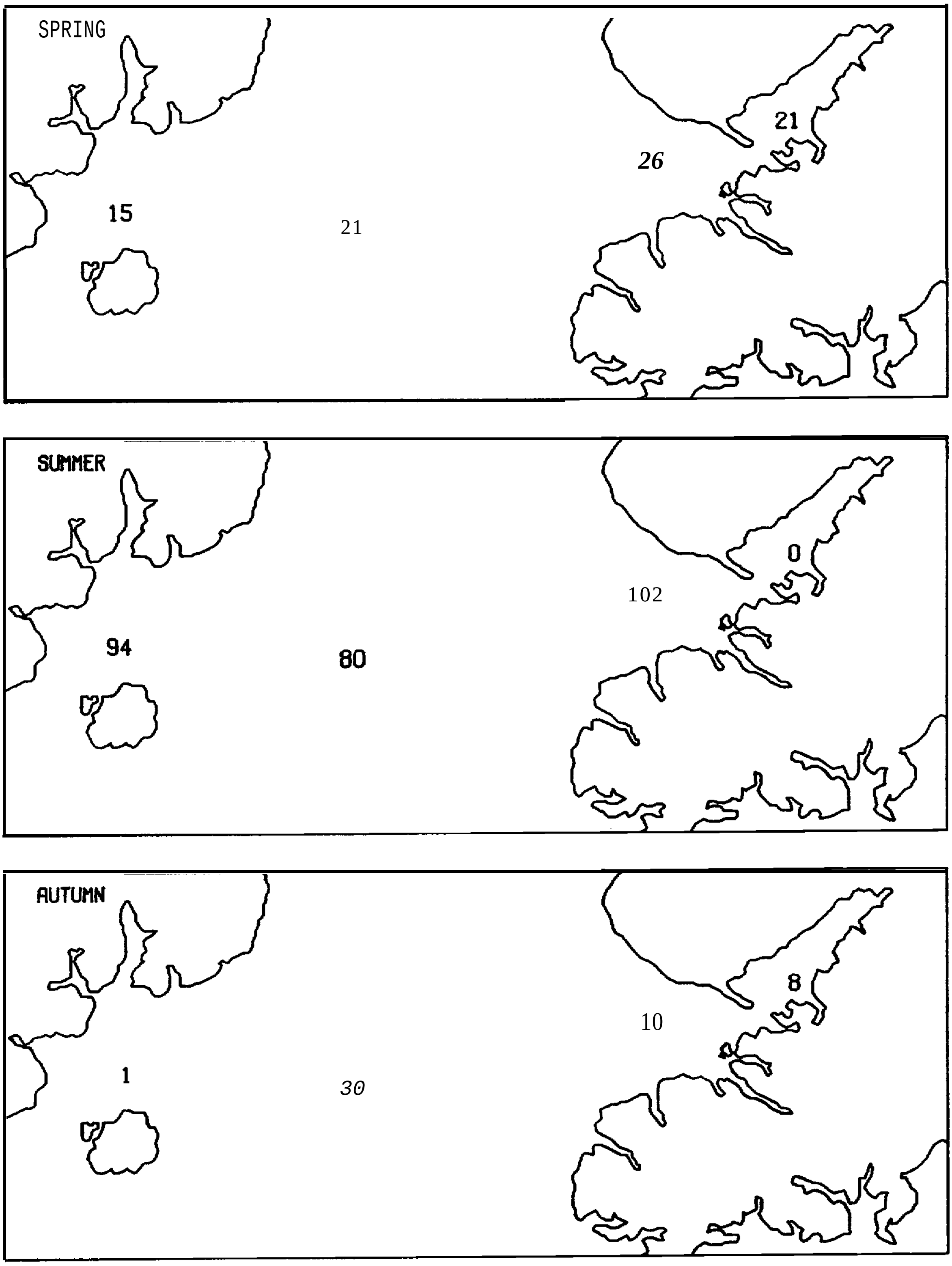


HIPPOGLOSSOIDES ELASSODON
LARVA/10 SQ M

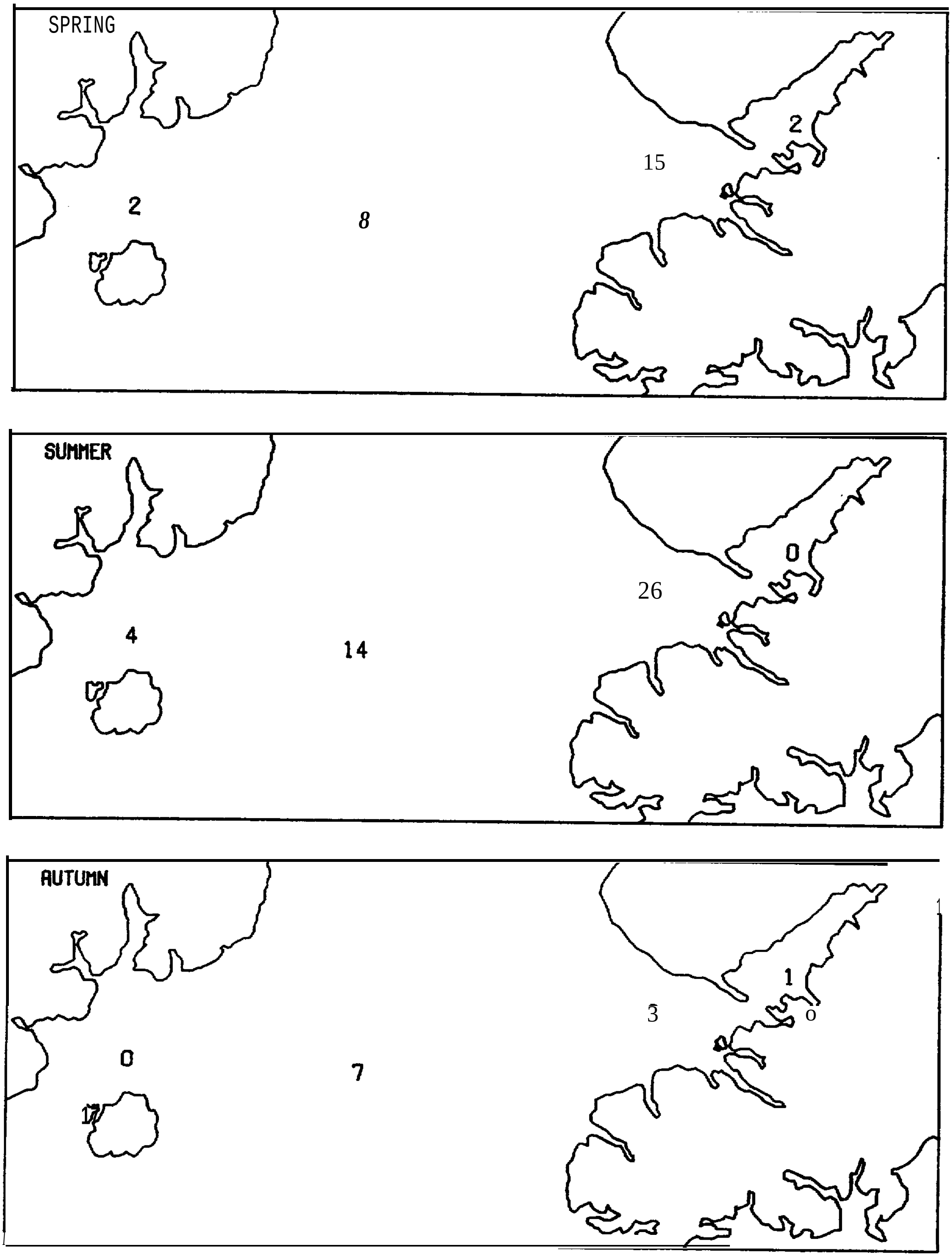
LIMANDA ASPERA
LARVA/10 SQ M



MALLOTUS VILLOSUS
LARVA/10 SQ M

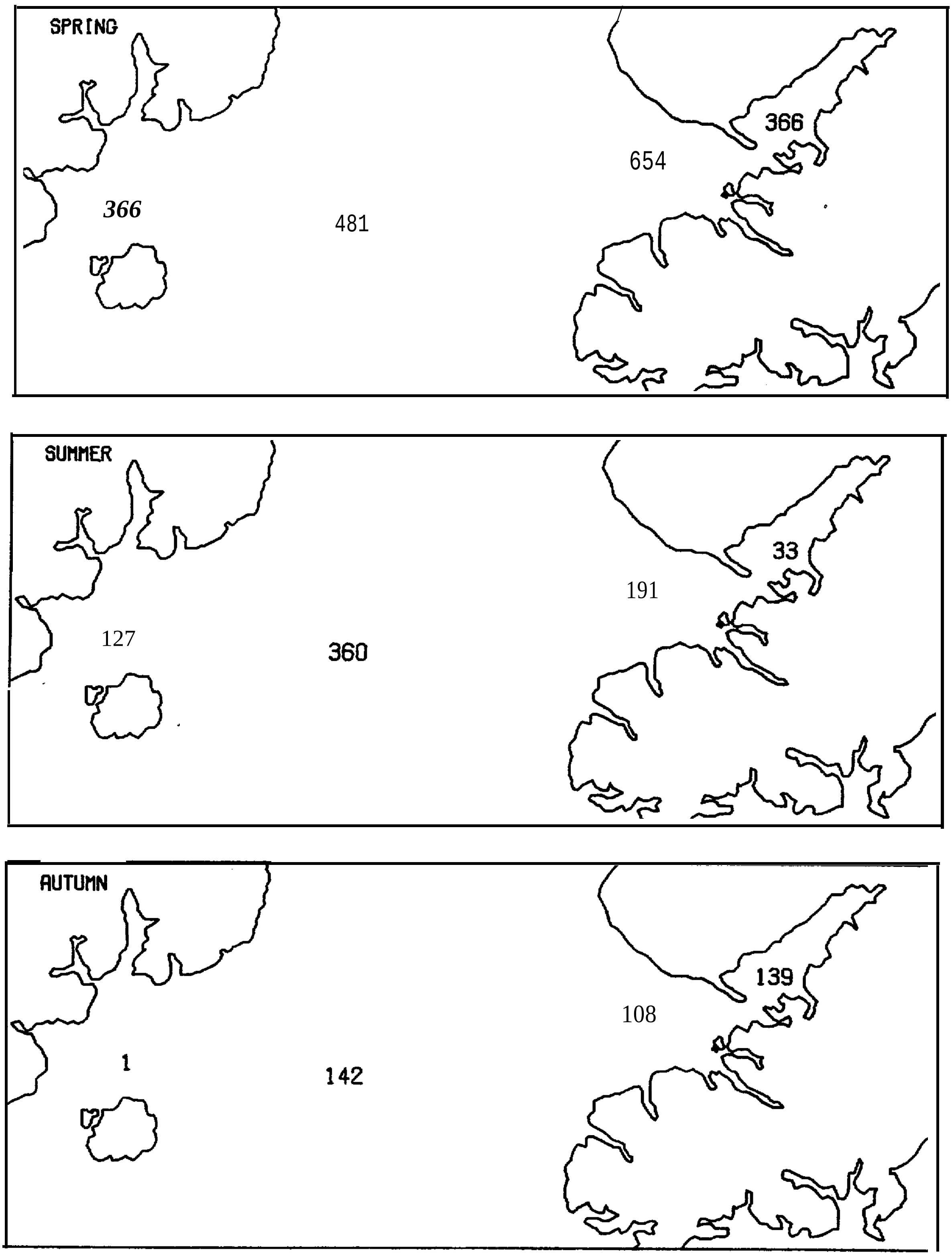


OSMERIDAE
LARVA/10 SQ M

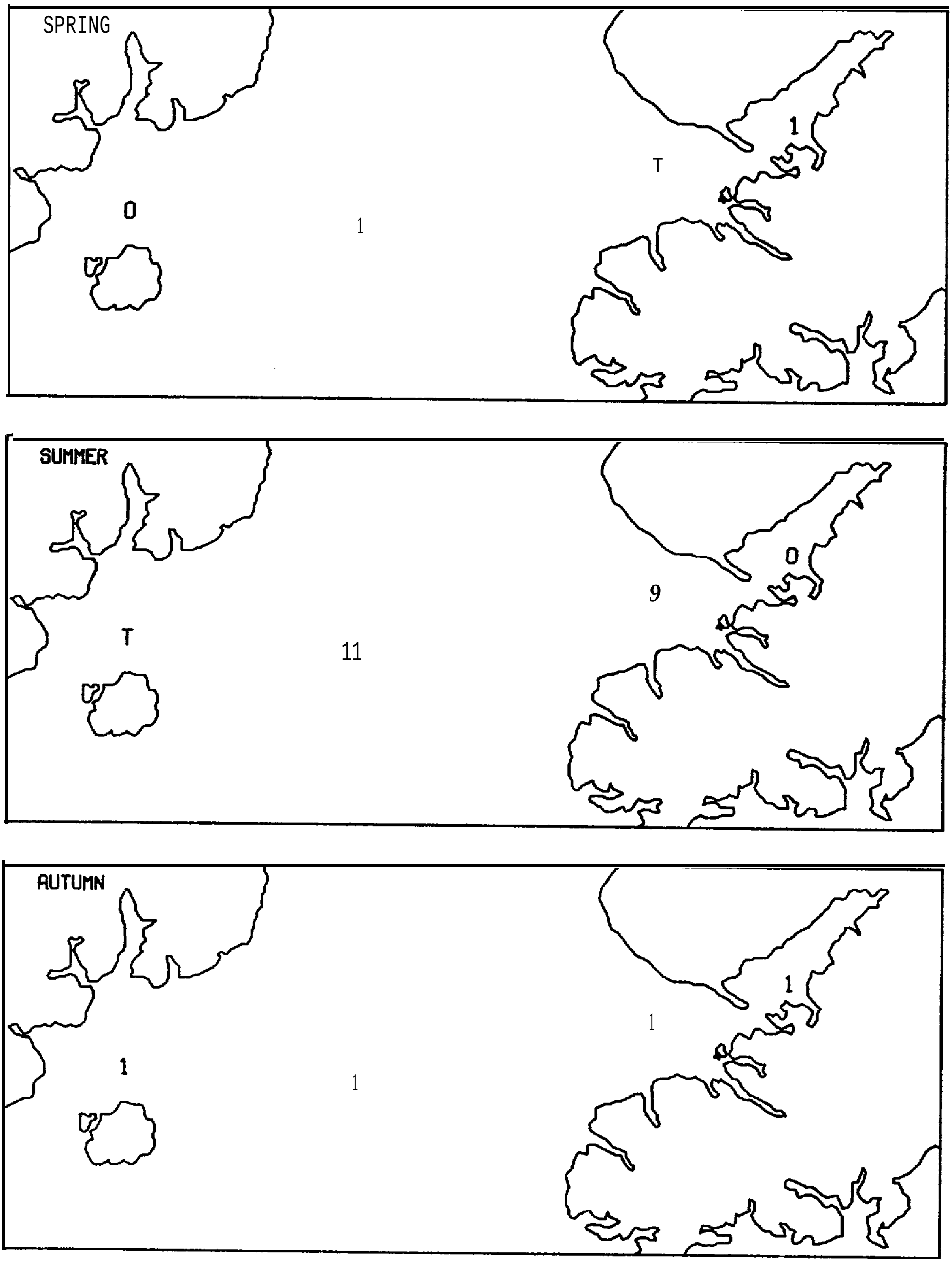


ANOMURA

ZOEA/10 SQ M

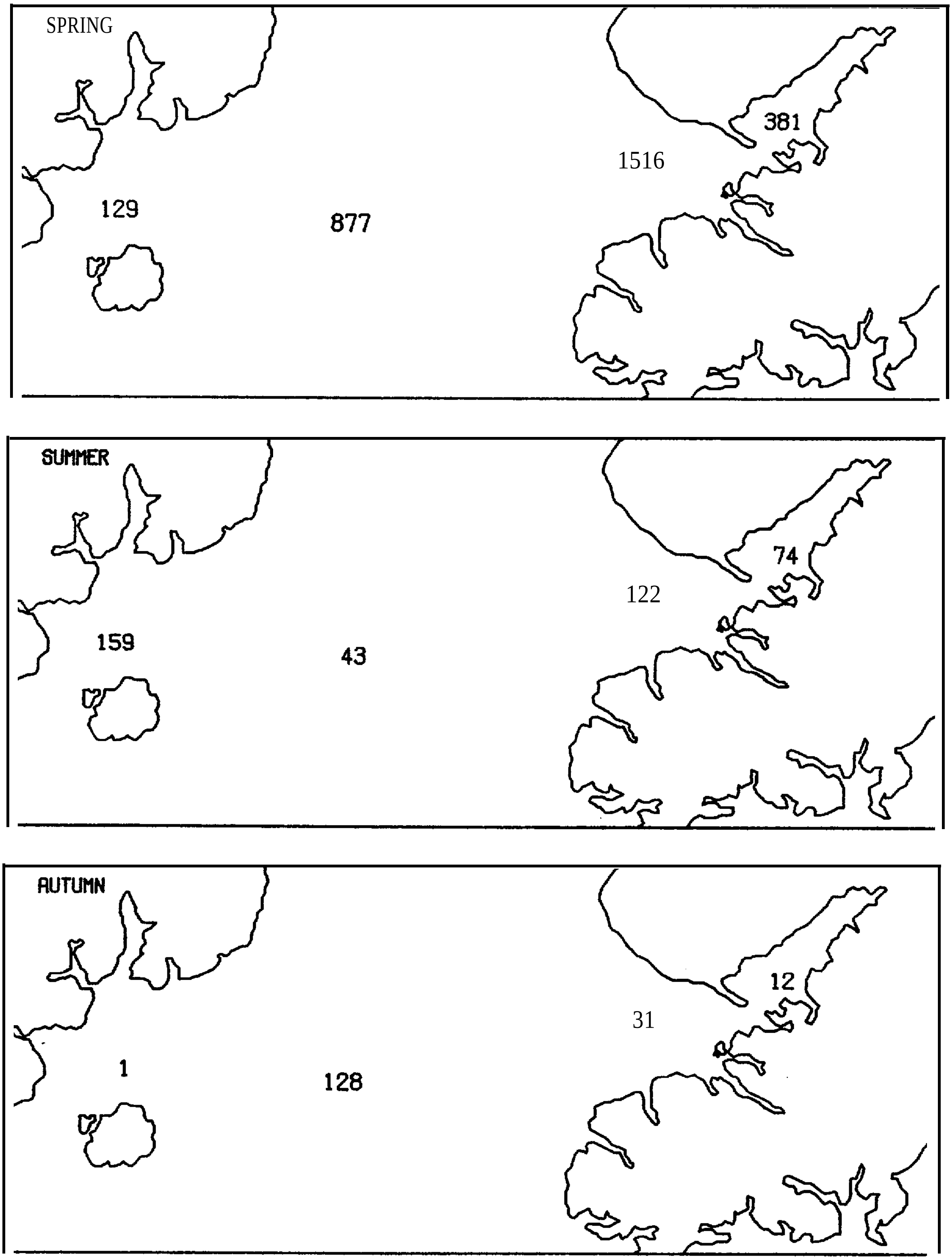


ANOMURA
MEGALOPA/1 O SQ M



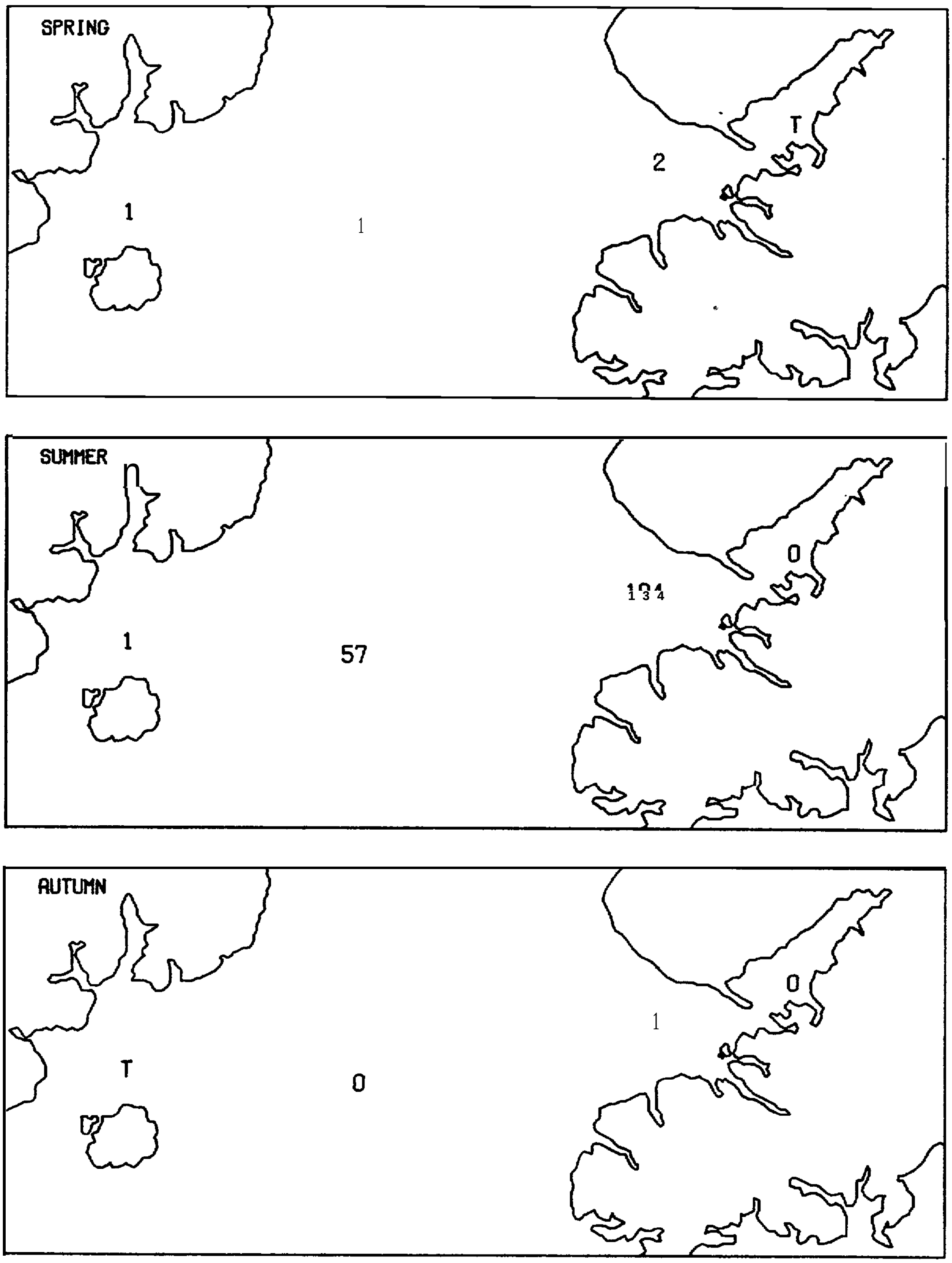
BRACHYURA

ZOEA/10 SQ M

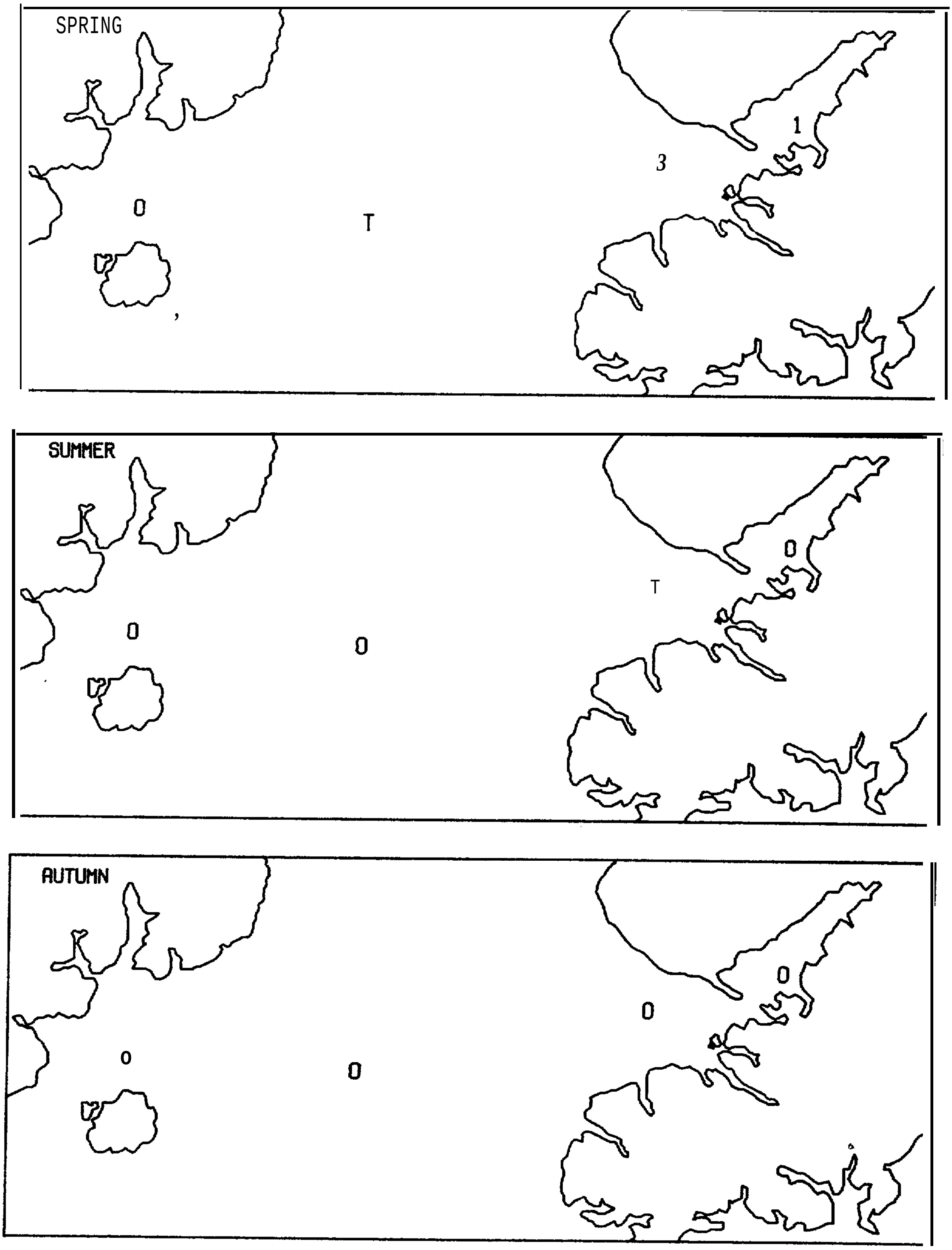


BRACHYURA

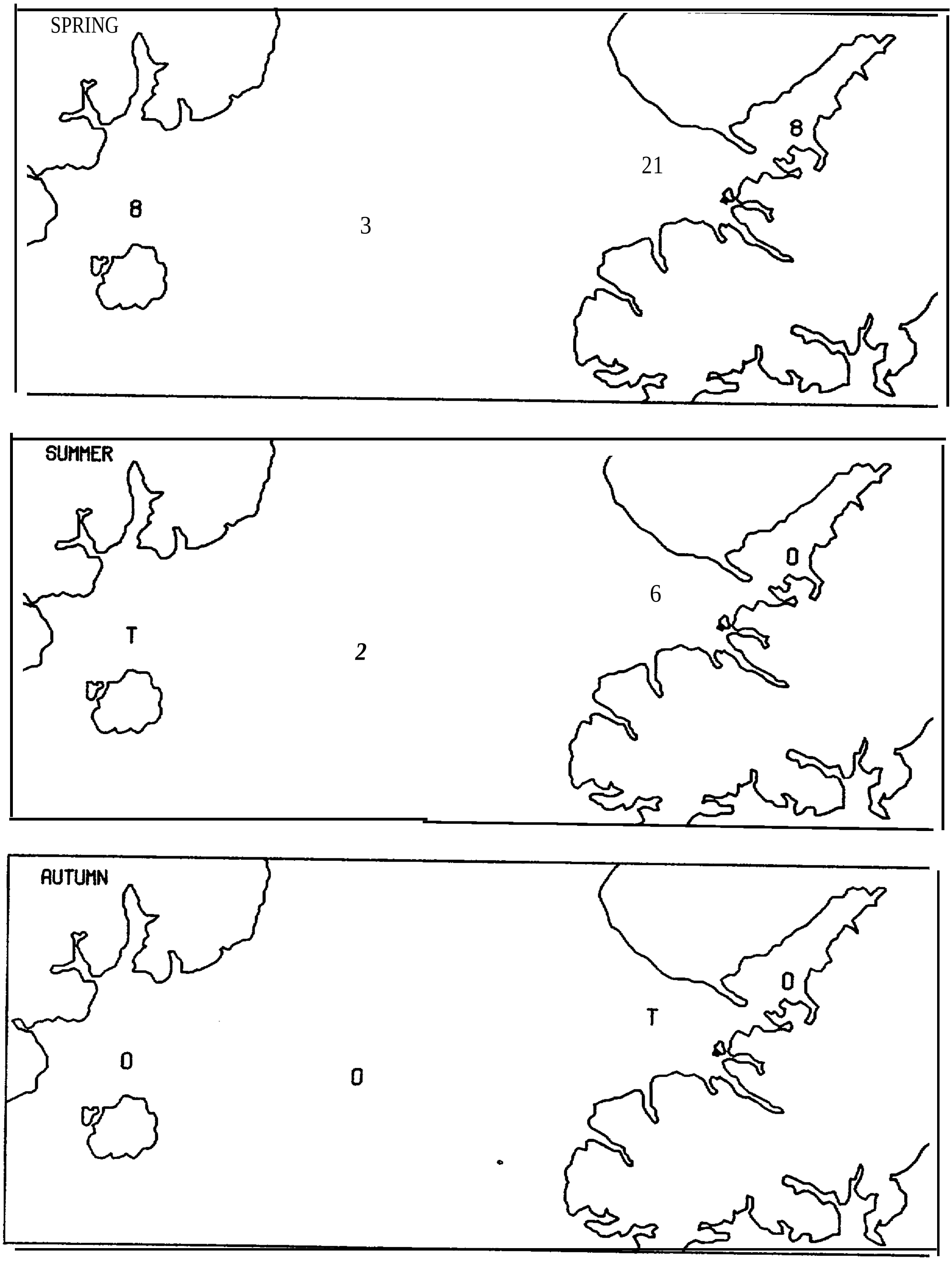
MEGRL(IPW1O SQ M



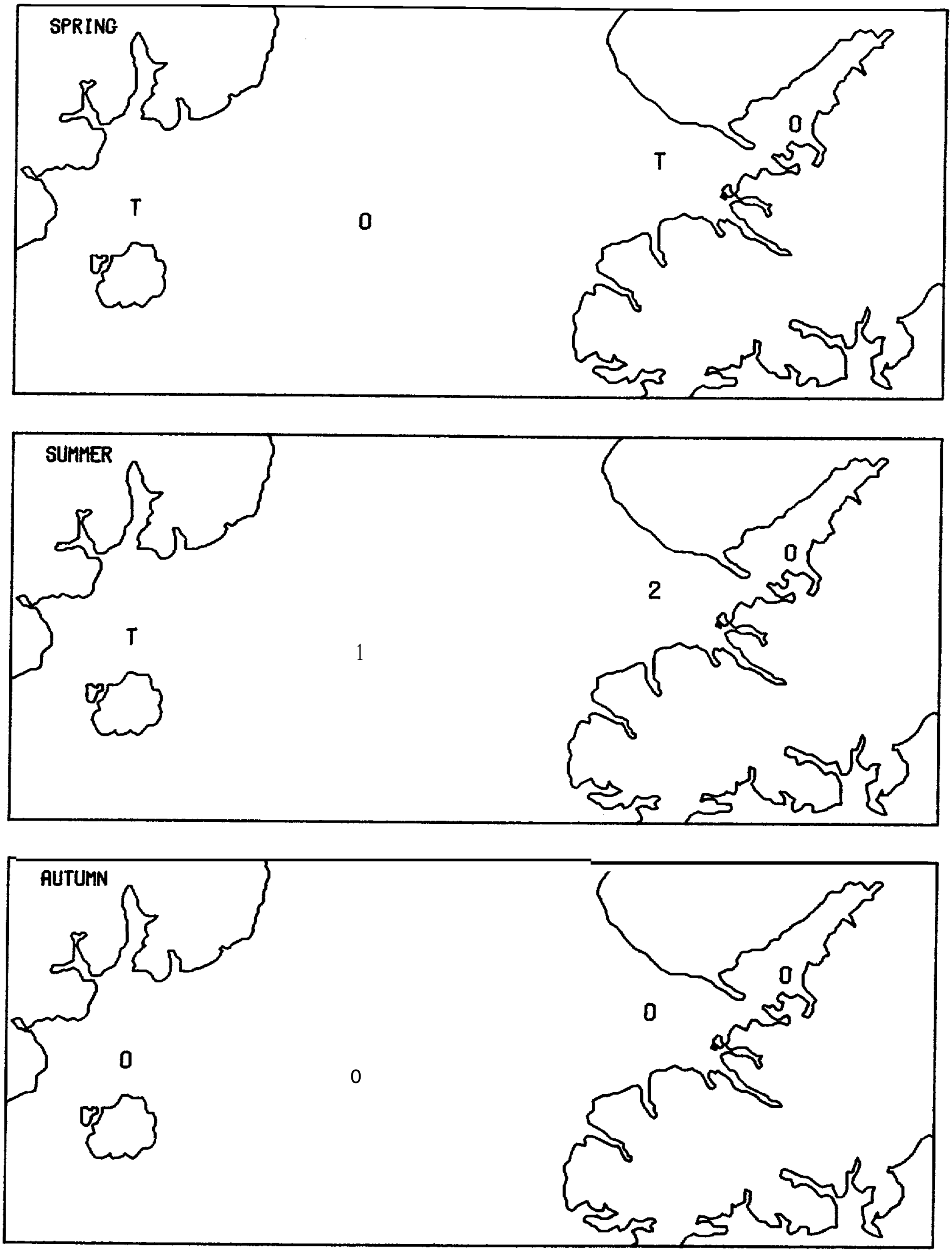
CANCER MAGISTER
STAGE 1/10 SQ M



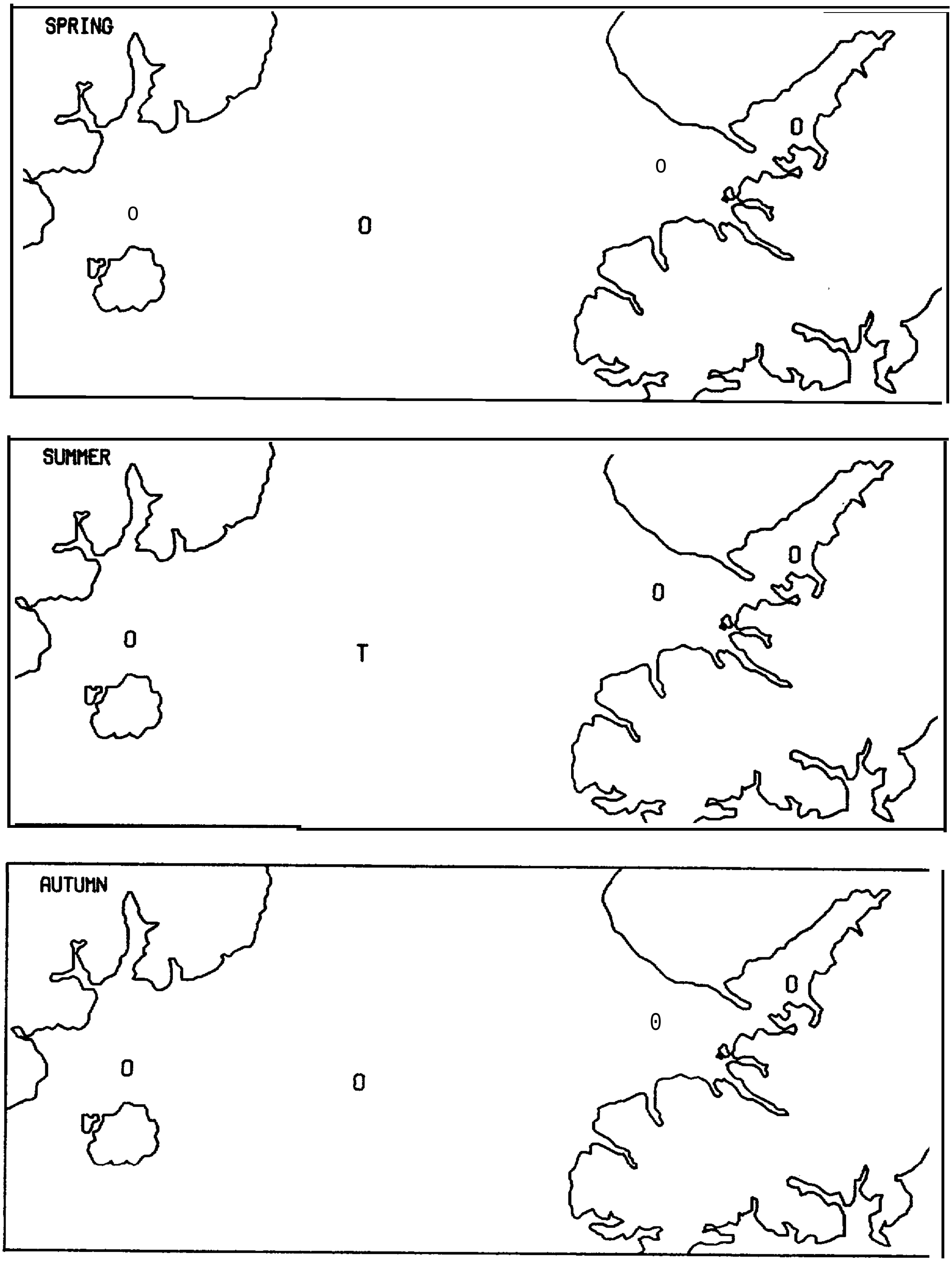
CANCER MAGISTER
STAGE 11/10 SQ M



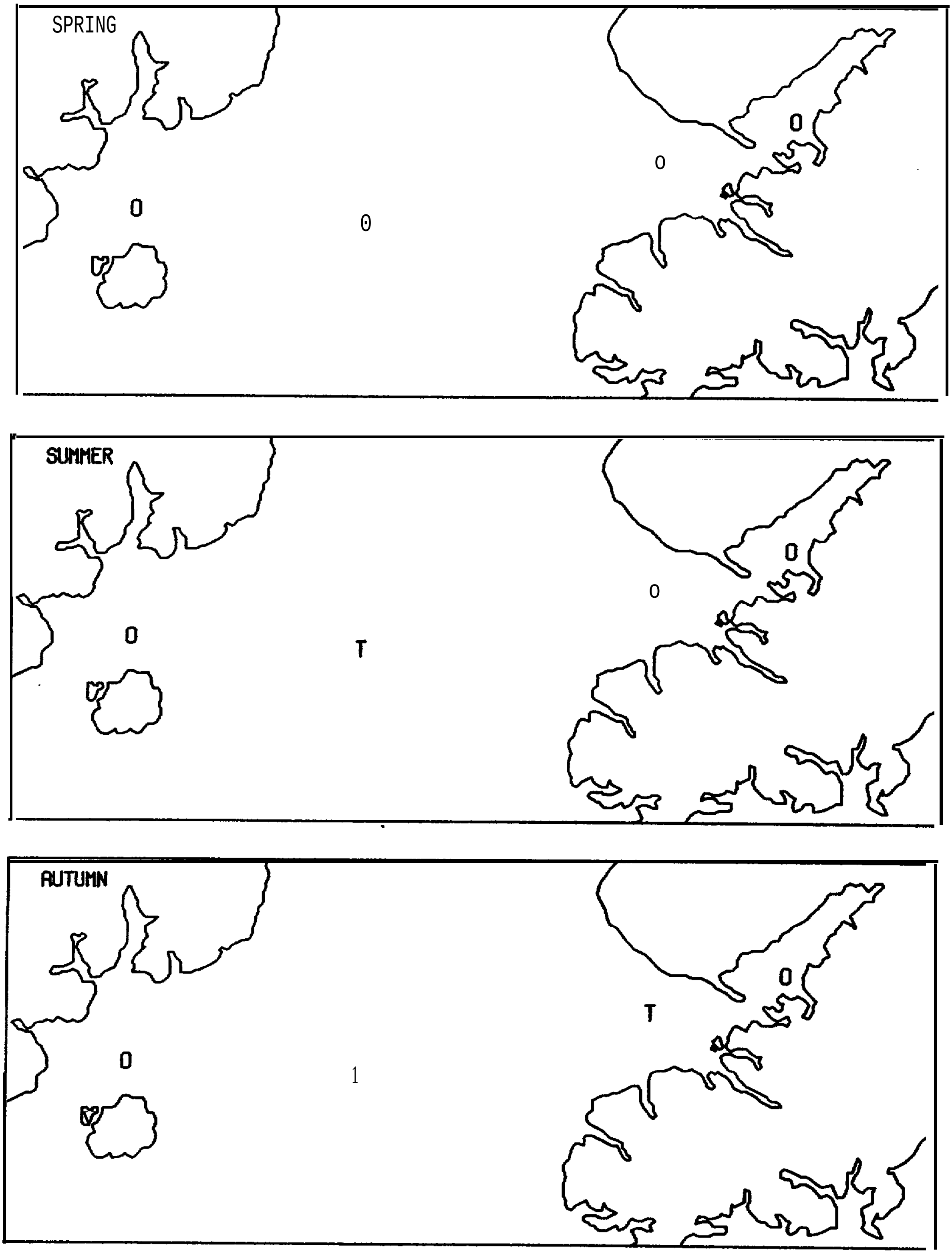
CANCER MAGISTER
STAGE 111/10 SQ M



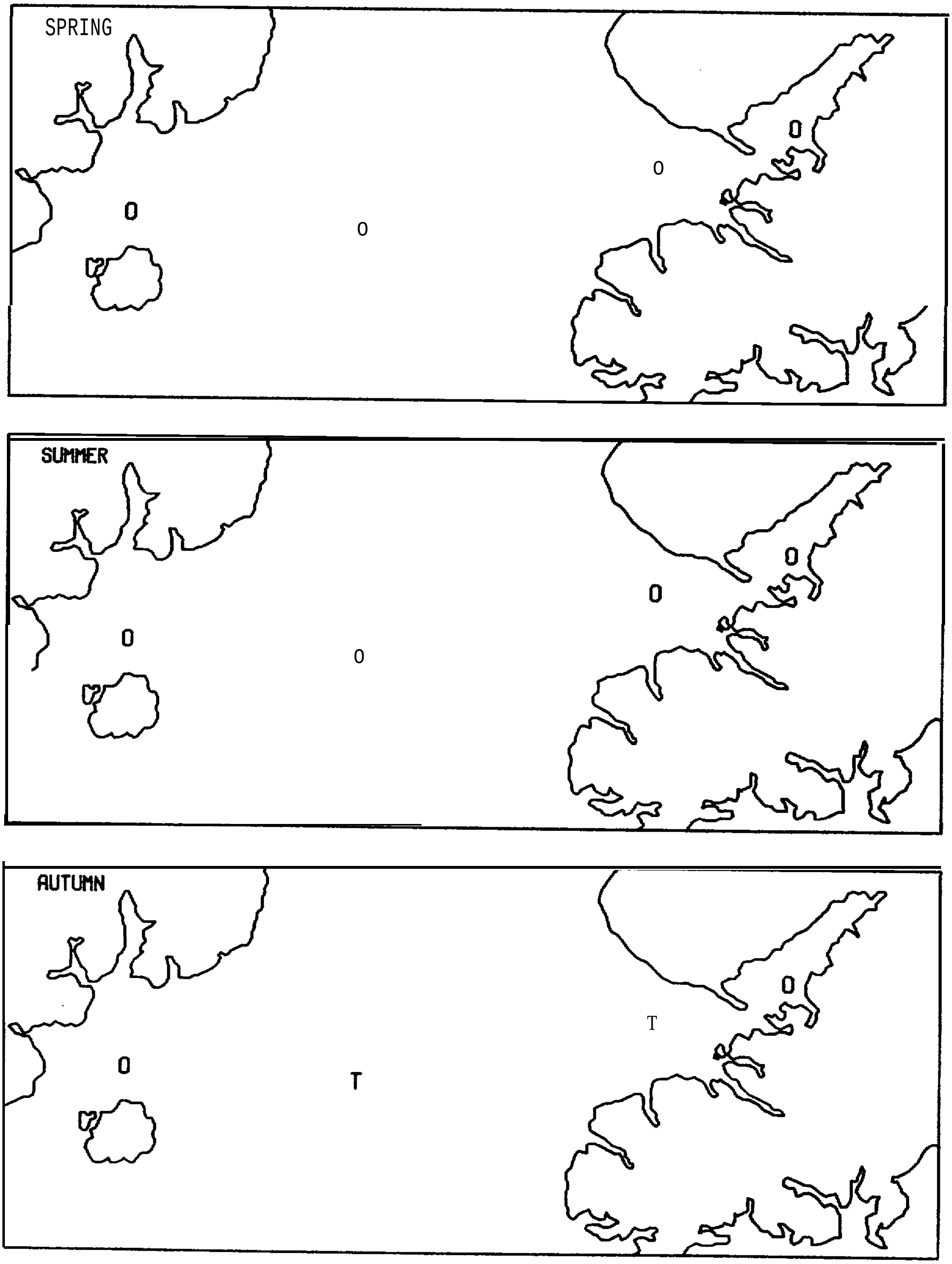
CANCER MAGISTER
STAGE IV/10 SQ M



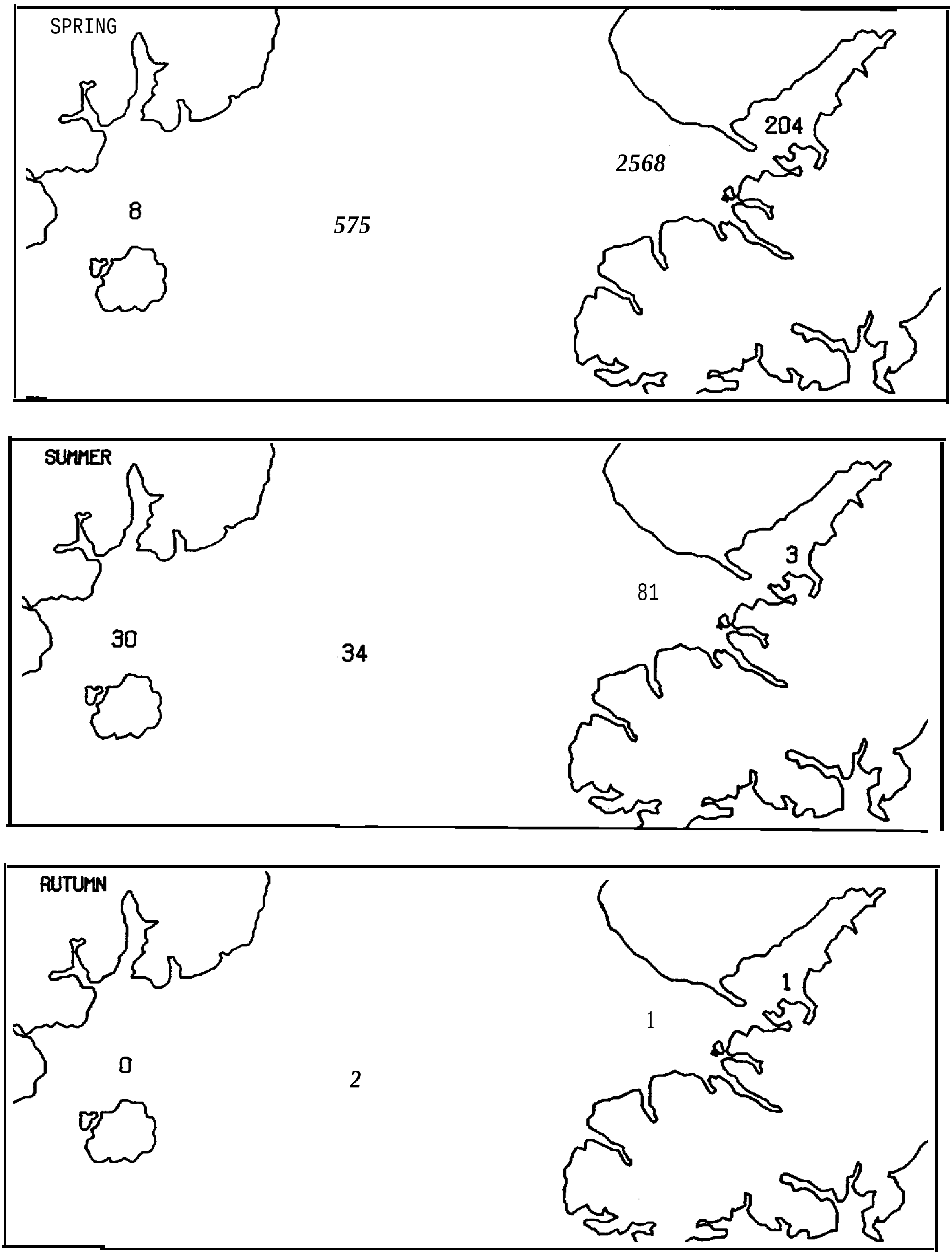
CANCER MAGISTER
STAGE V/10 SQ M



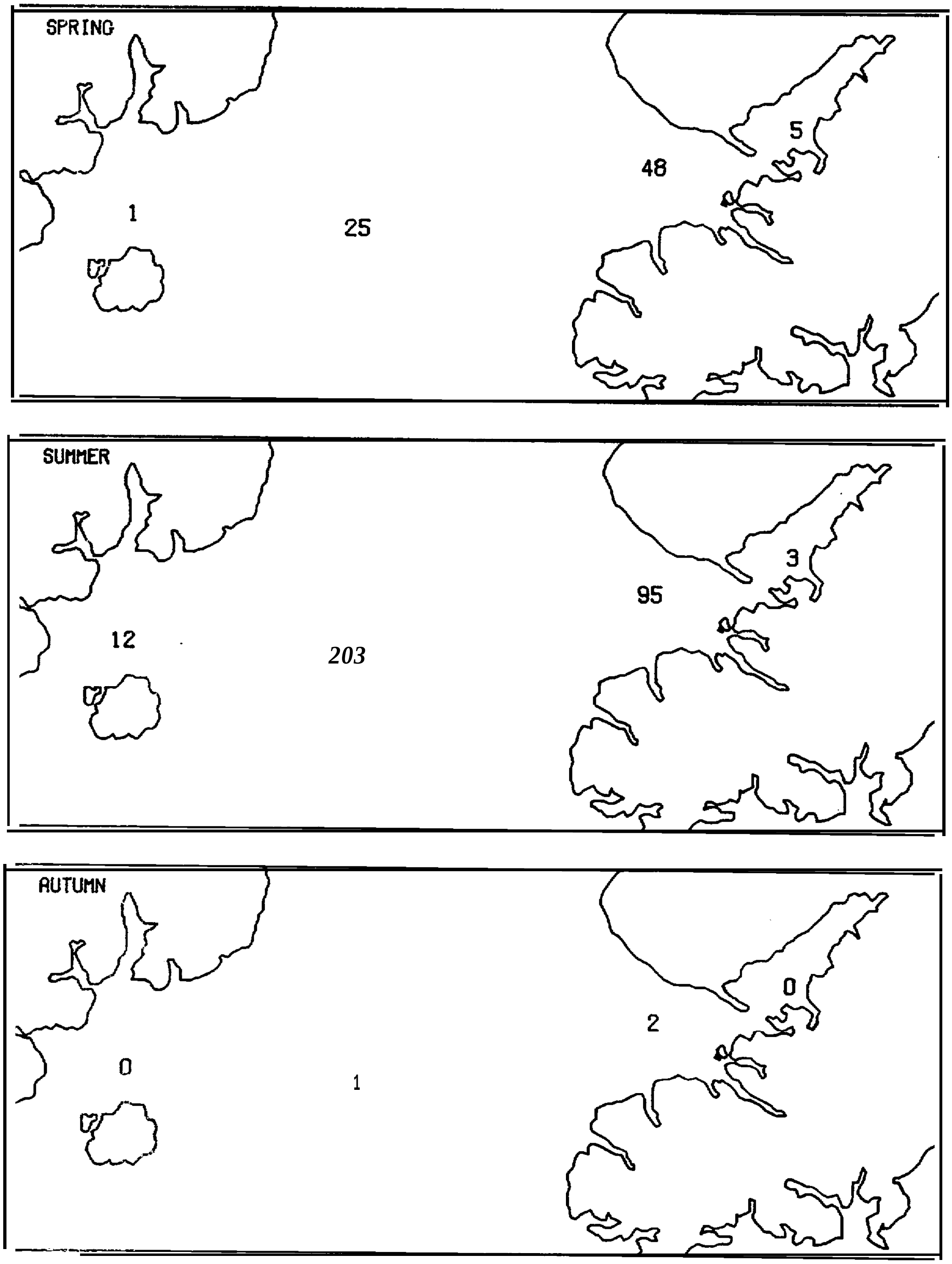
CANCER MAGISTER
MEGALOPA/10 SQ M



CANCER SPP.
STAGE 1/10 SQ M

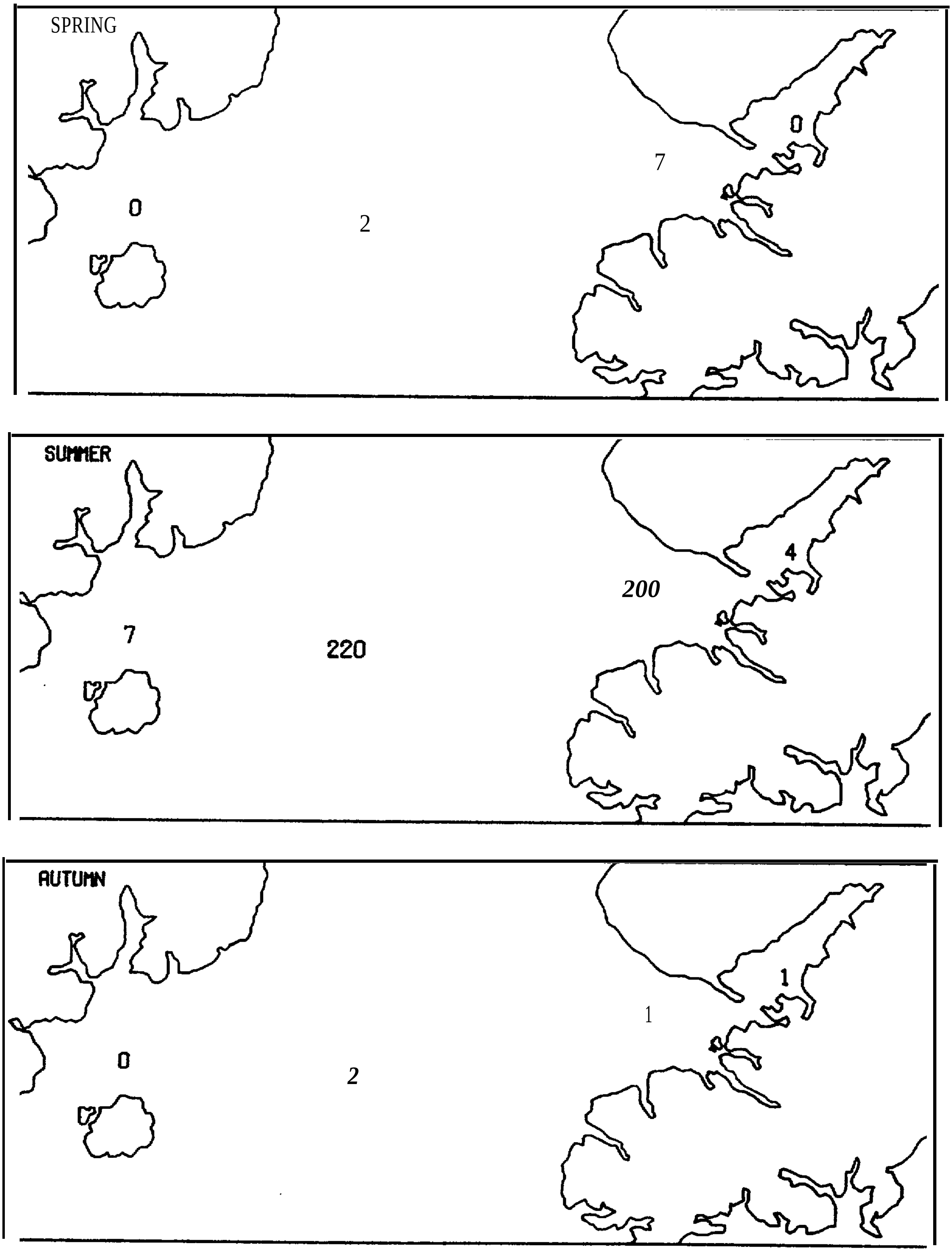


CANCER SPP.
STAGE 11/10 SQ M

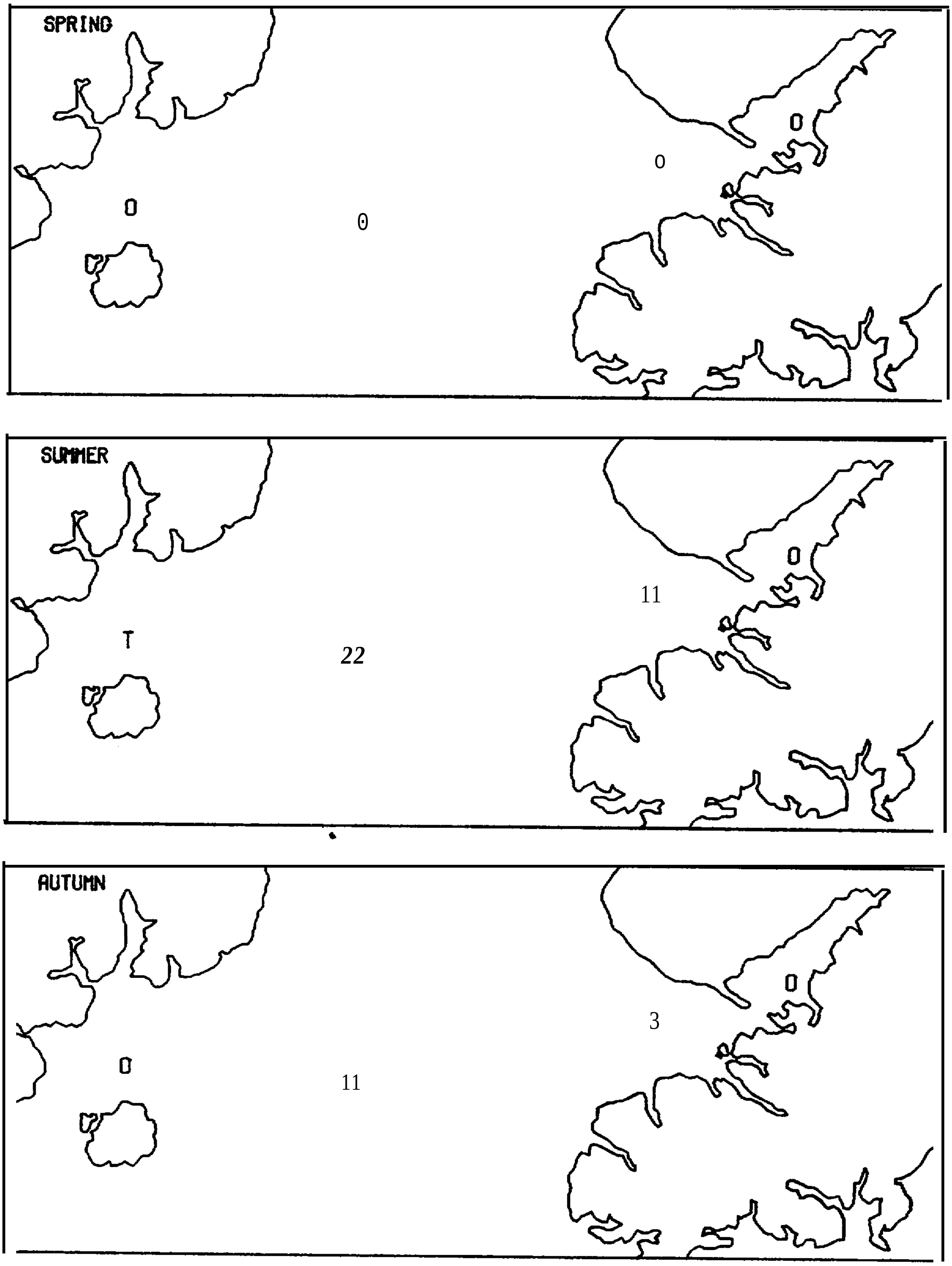


CANCER SPP.

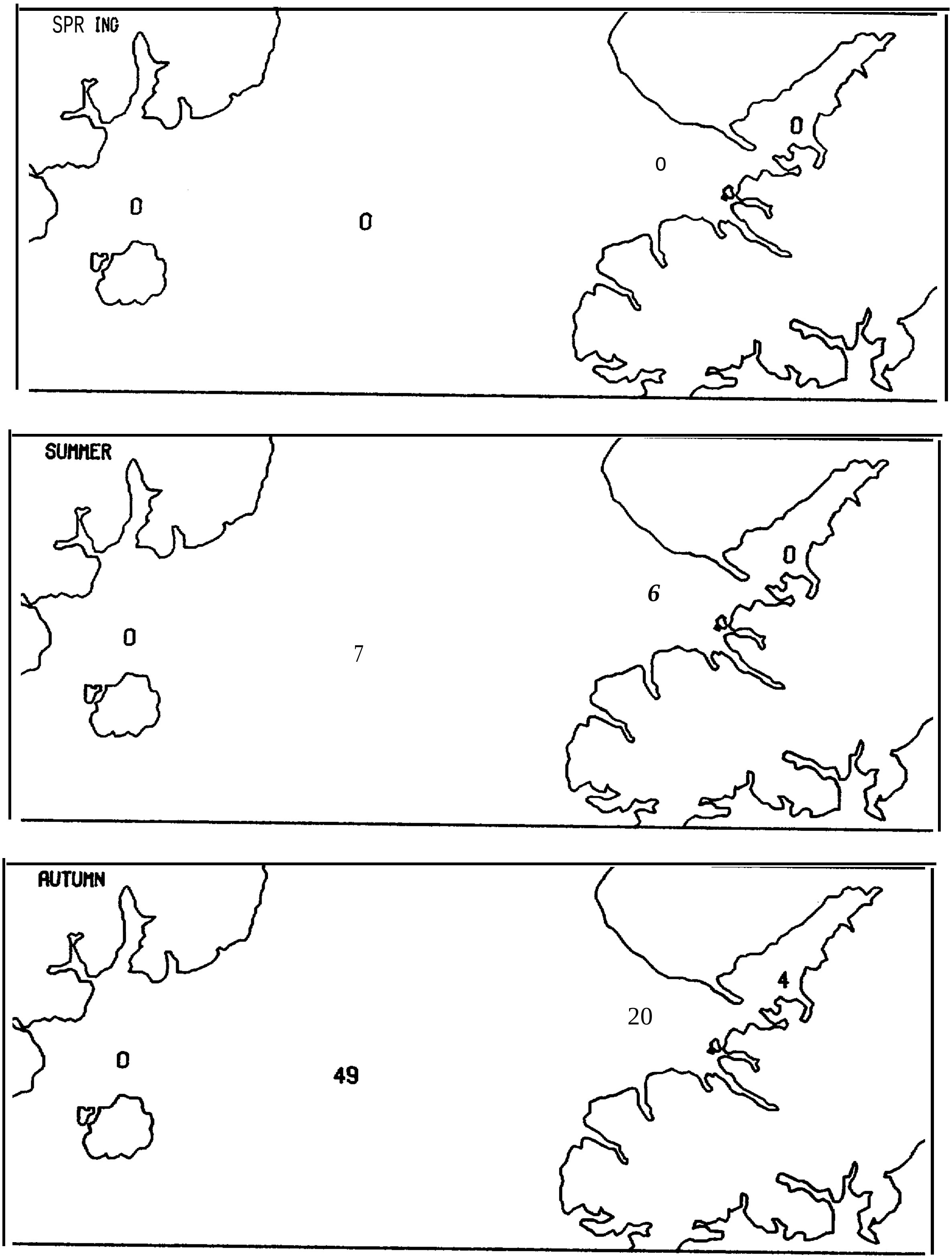
STAGE 111/10 SQ M



CANCER SPP.
STAGE IV/10 SQ M

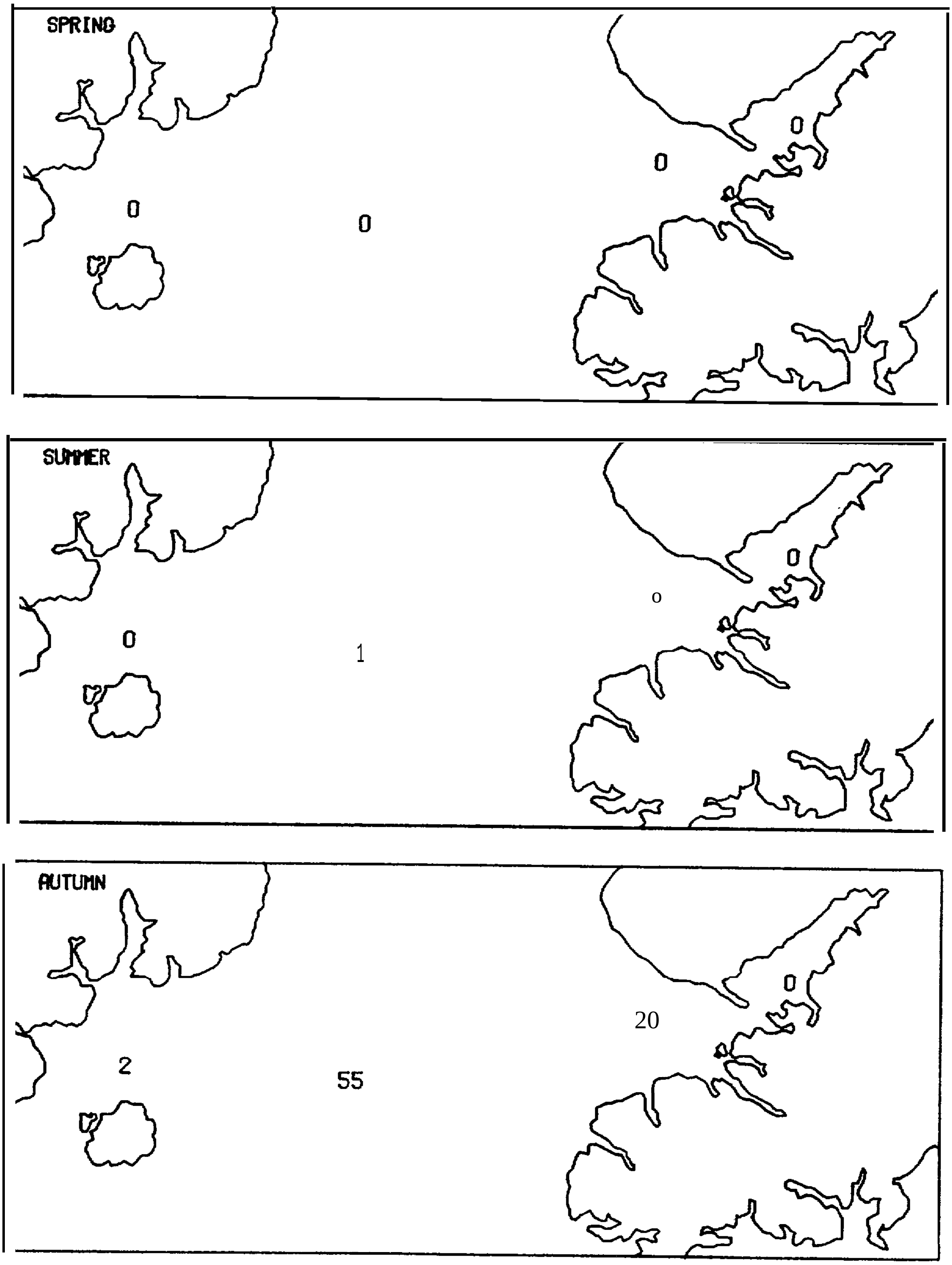


CANCER SPP.
STAGE V/10 SQ M

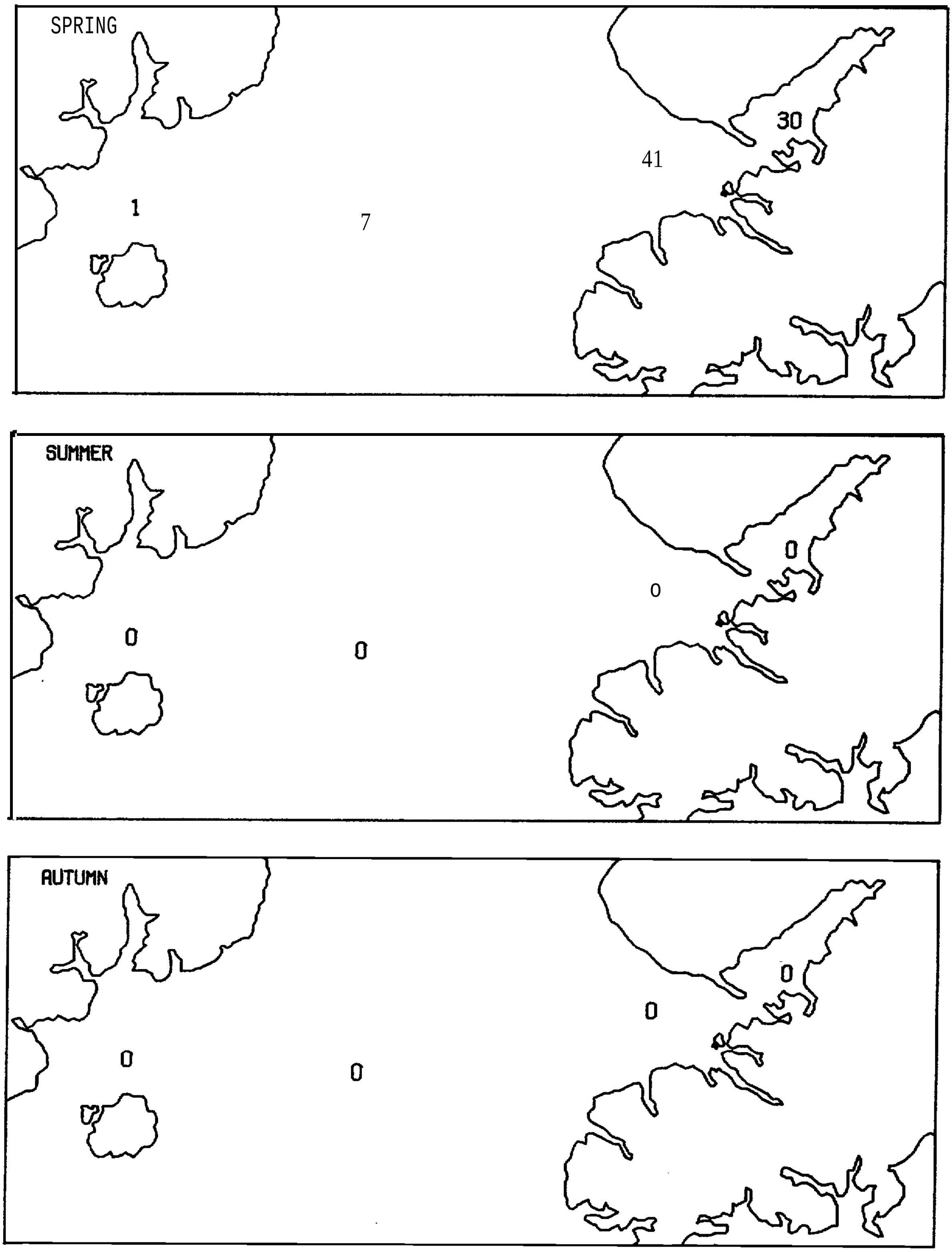


CANCER SPP.

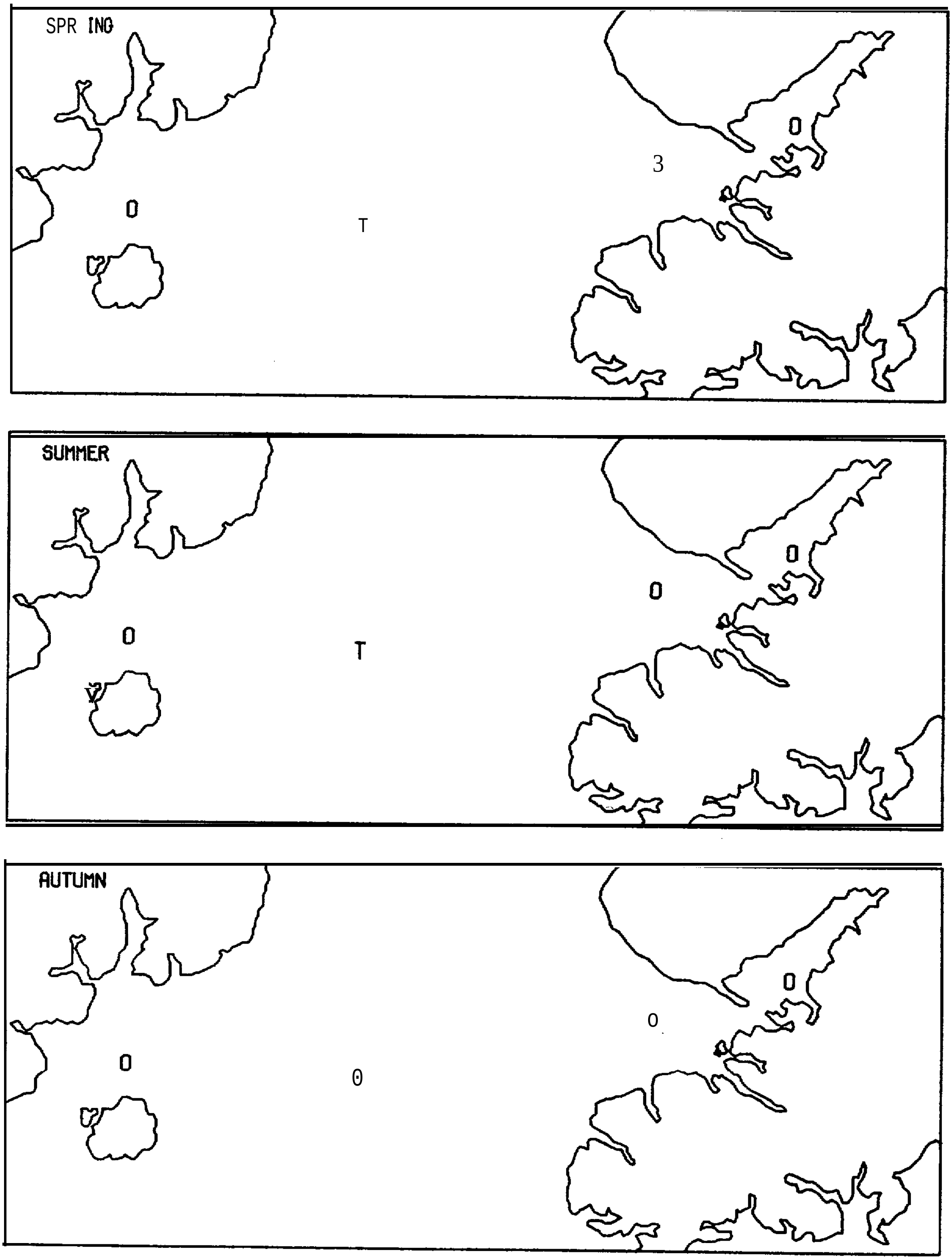
MEGALOPA/1 O SQ M



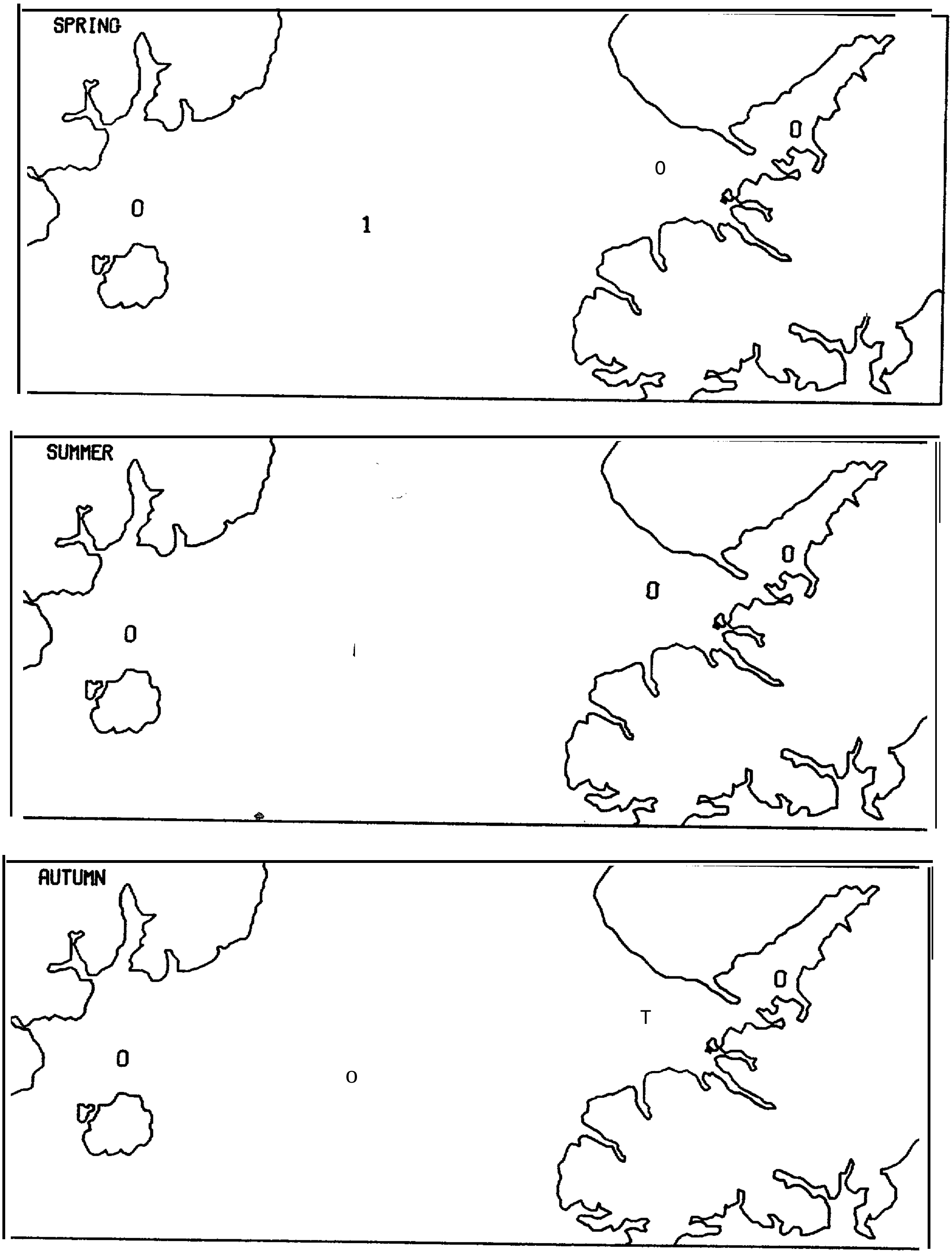
CHIONOECETES BAIRDI
STAGE 1/10 SQ M



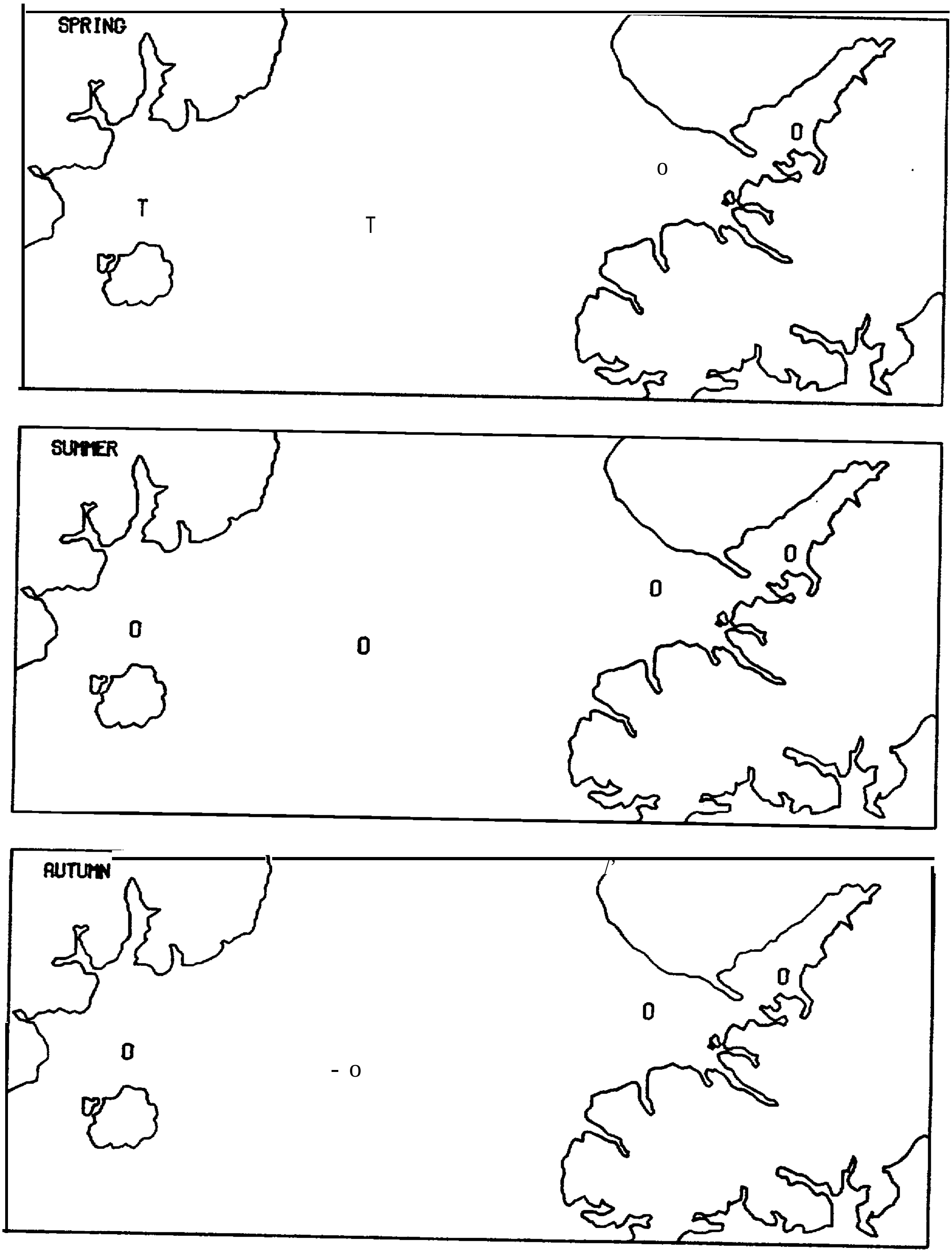
CHIONOECETES BAIRDI
STAGE 11/10 SQ M



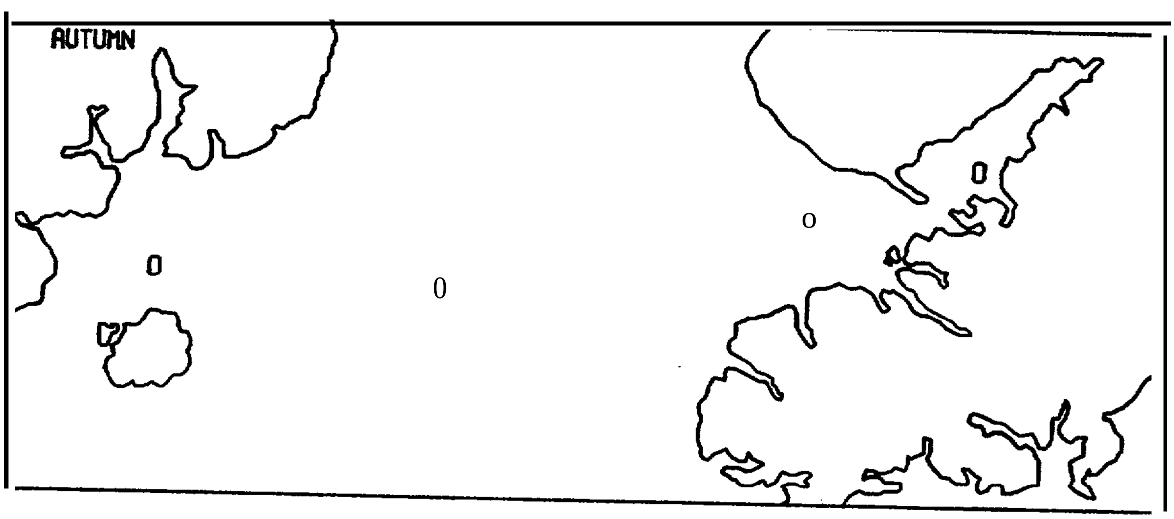
CHIONOECETES BAIRDI
MEGALOPA/10 SQ M



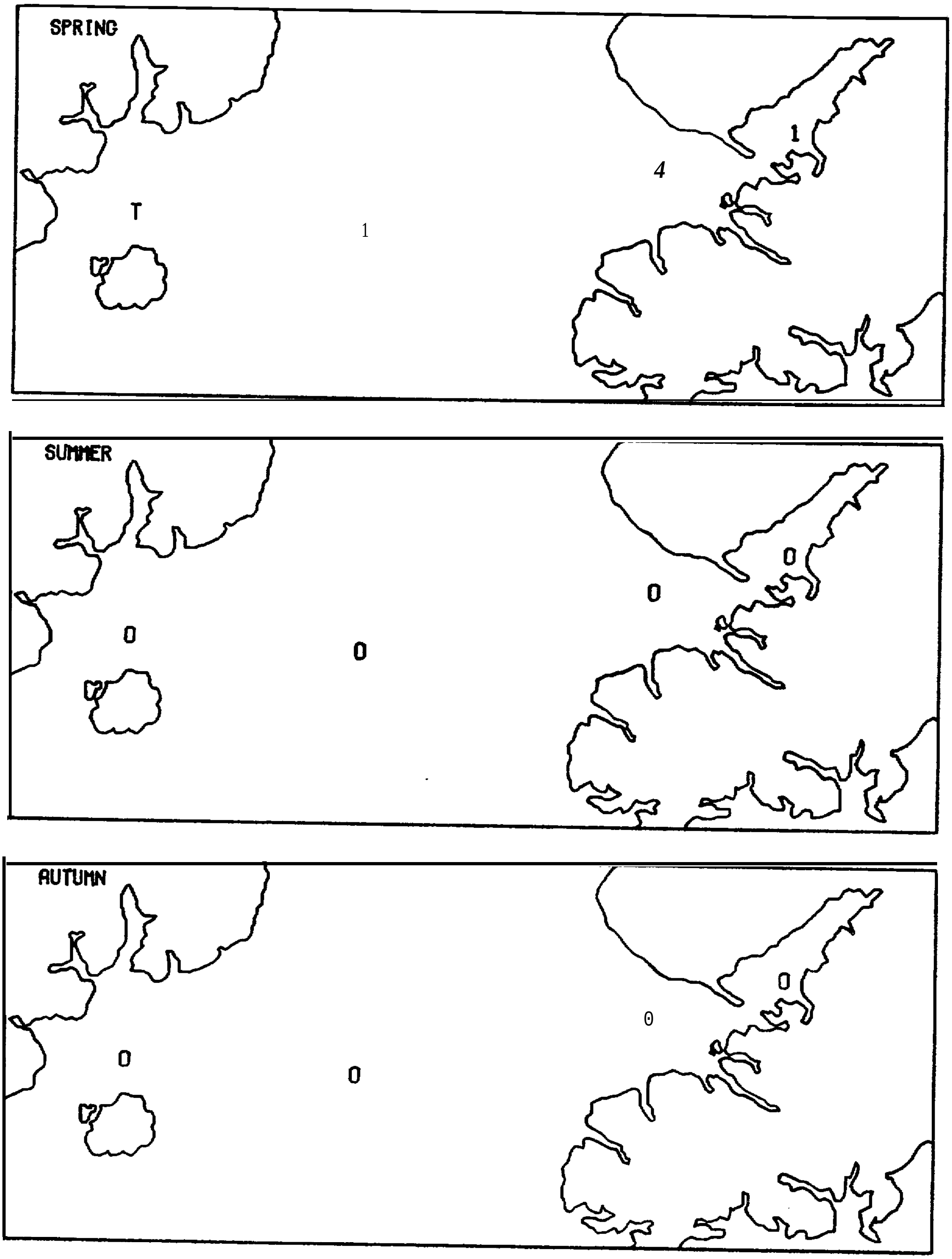
PARALITHODES CAMTSCHATICA
STAGE 11/10 SQ M



PARALITHODES CAMTSCHATICA
STAGE III/10 SQ M

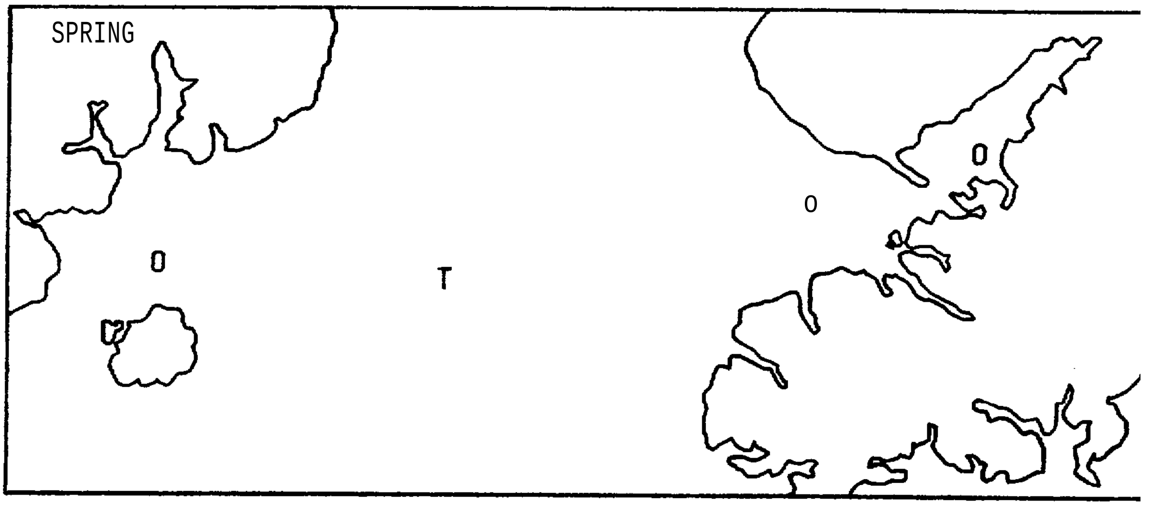


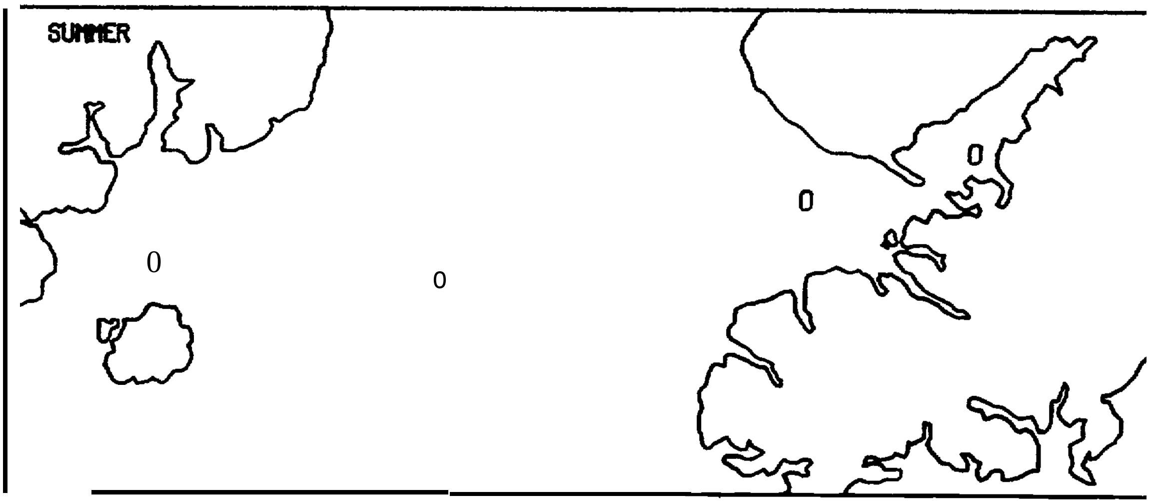
PARALITHODES CAMTSCHATICA
STAGE IV/10 SQ M



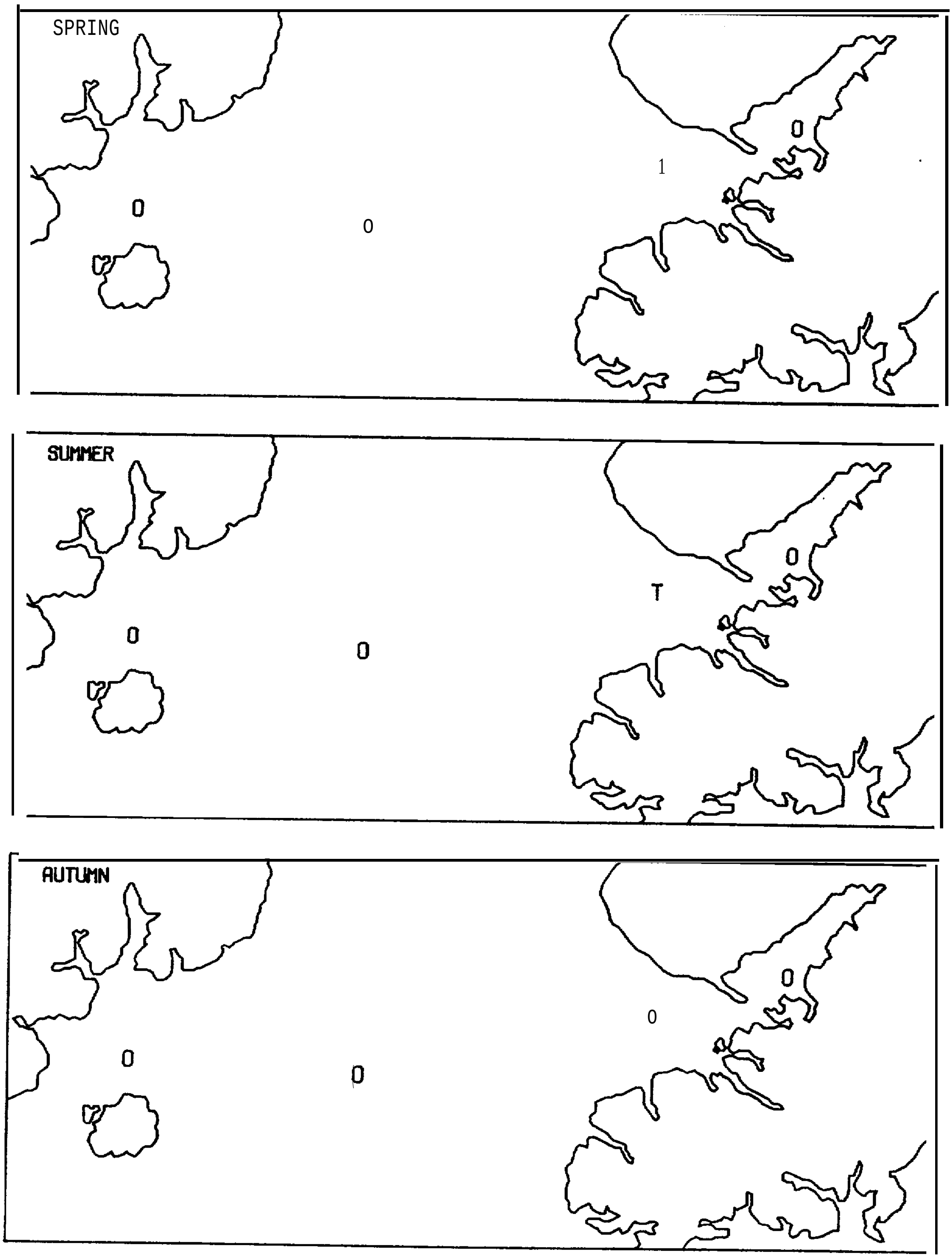
PARALITHODES CAMTSCHATICA

MEORLOPIV10 SQ M

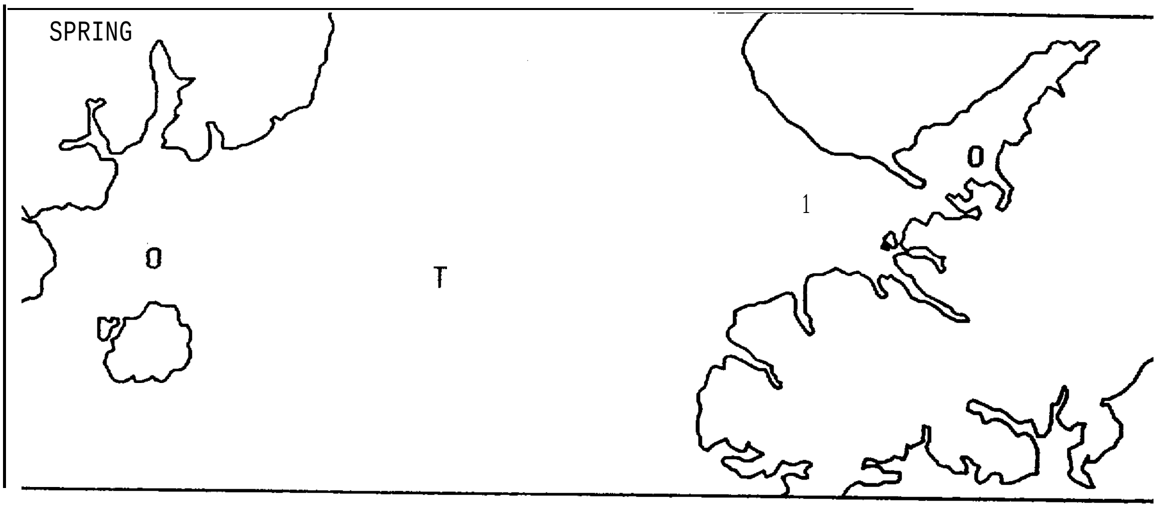


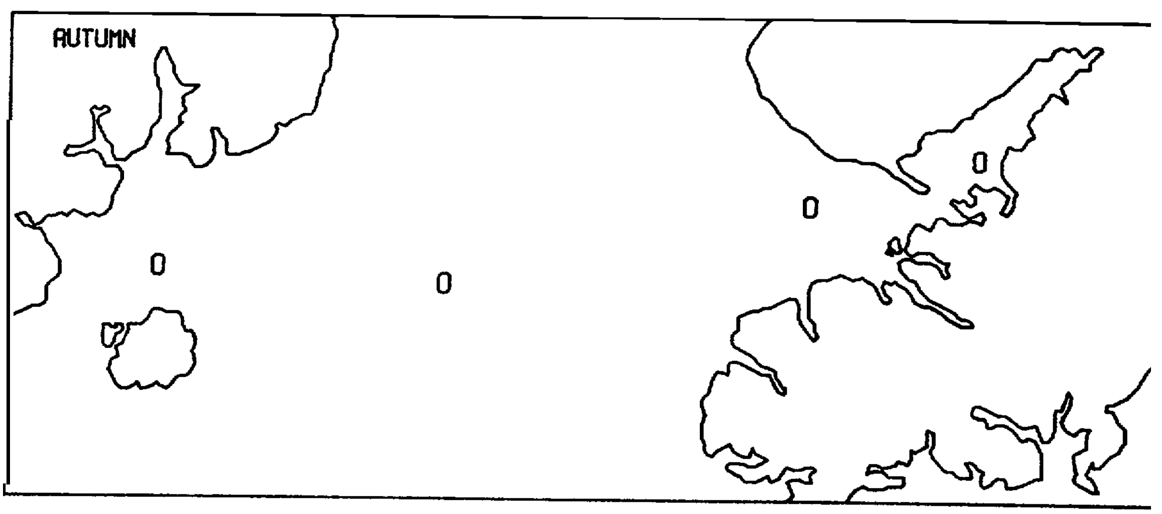


PANDALOPSIS DISPAR
STAGE 1/10 SQ M



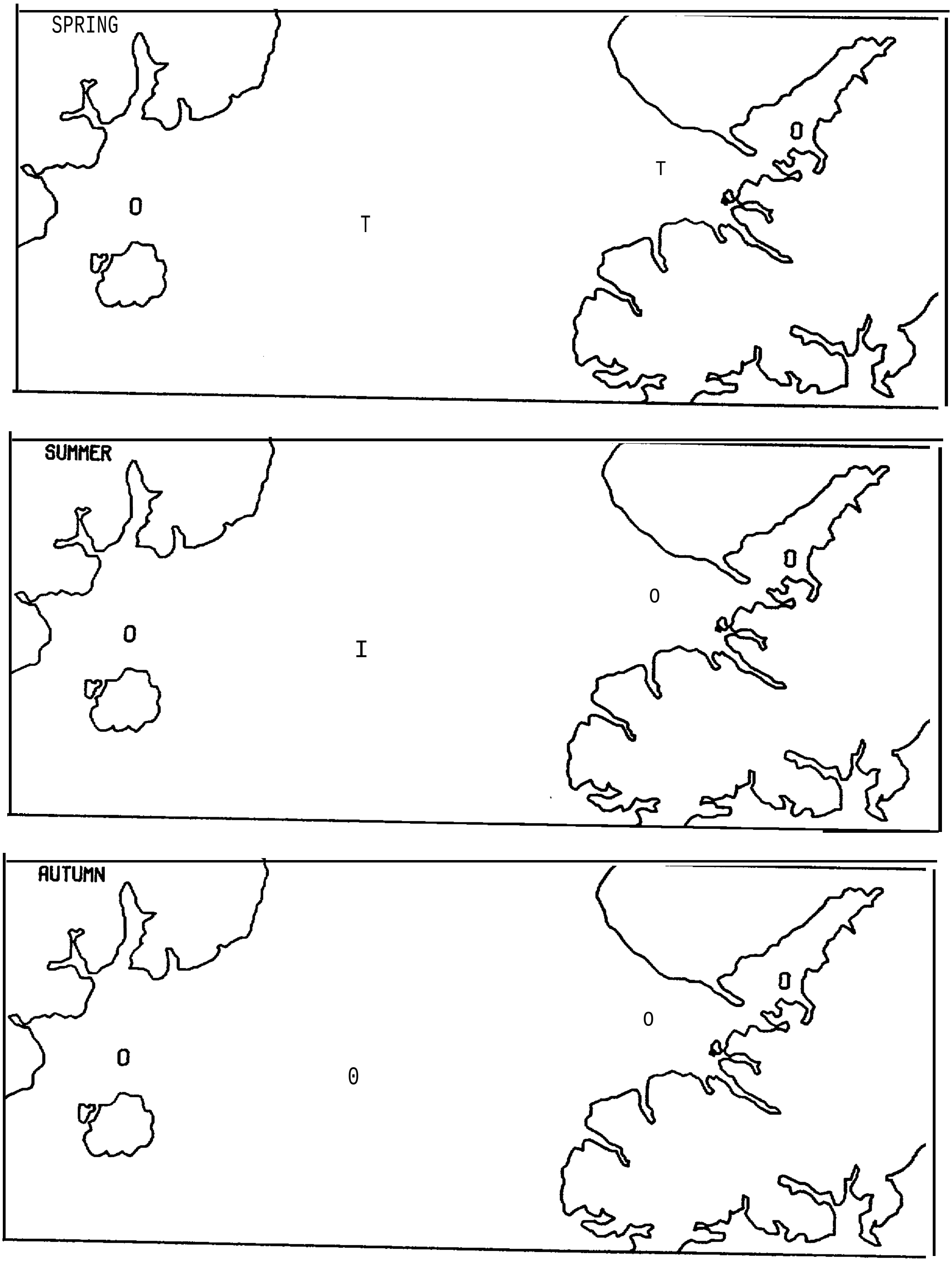
PANDALOPSIS DISPAR
STAGE 11/10 SQ M



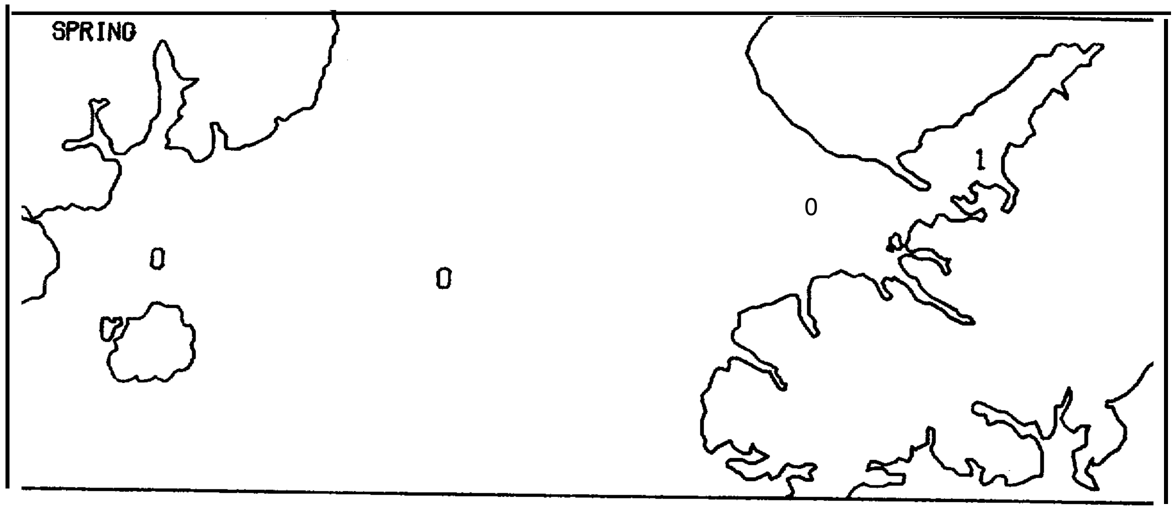


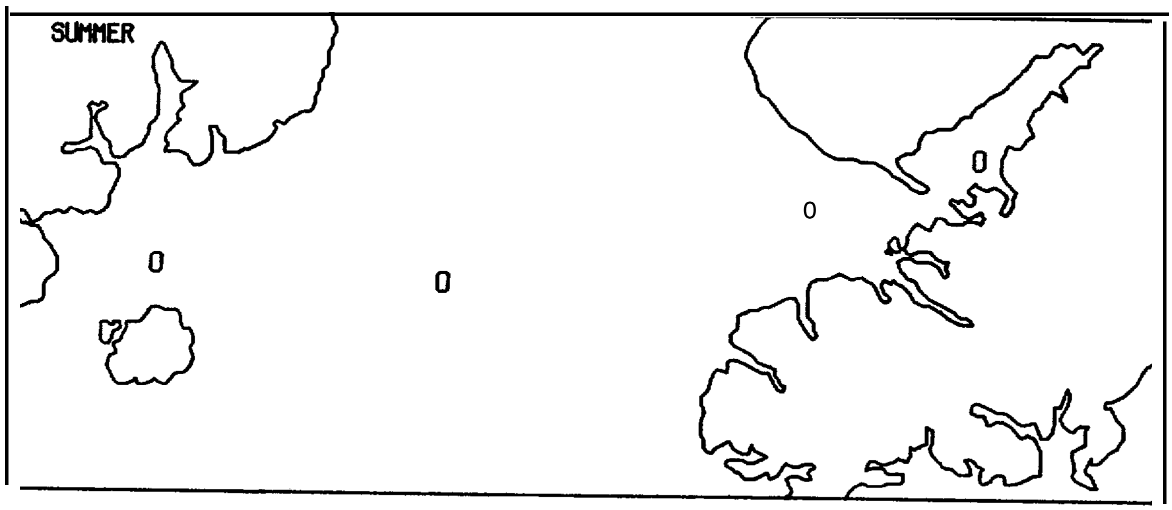
PANDALOPSIS DISPAR

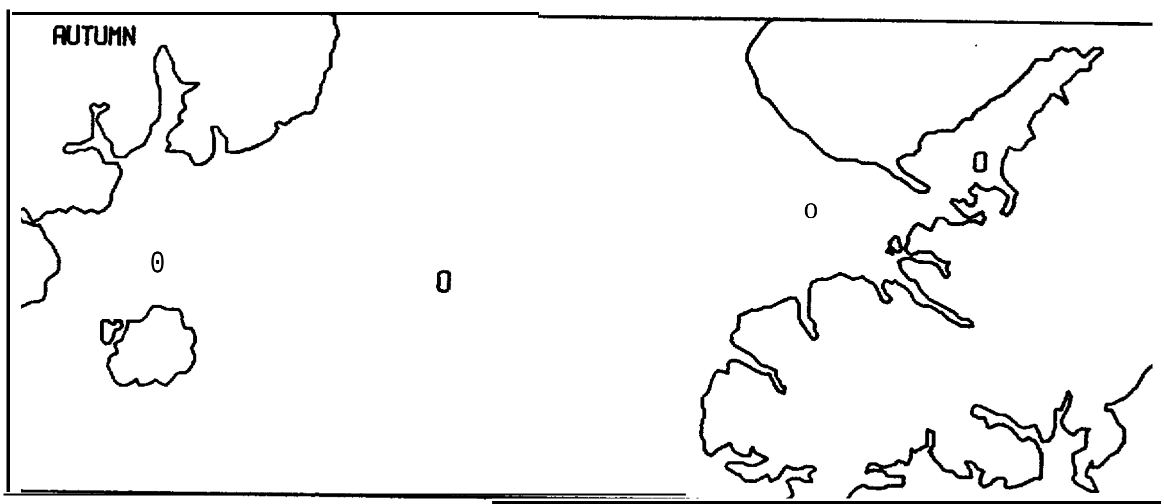
STAGE III/10 SQ M



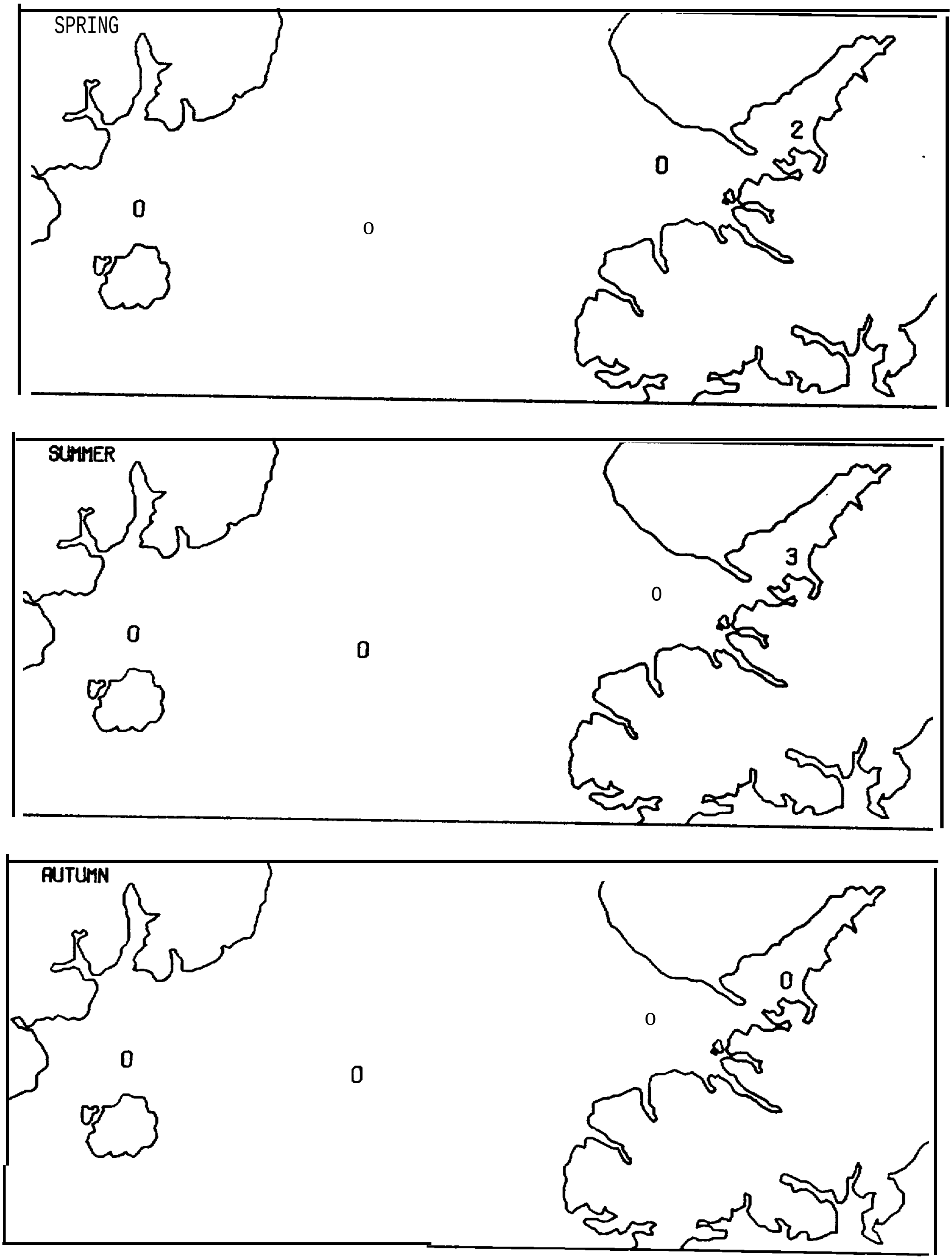
PANDALUS BOREALIS
STAGE I/10 SQ M







PANDALUS BOREALIS
STAGE II/10 SQ M



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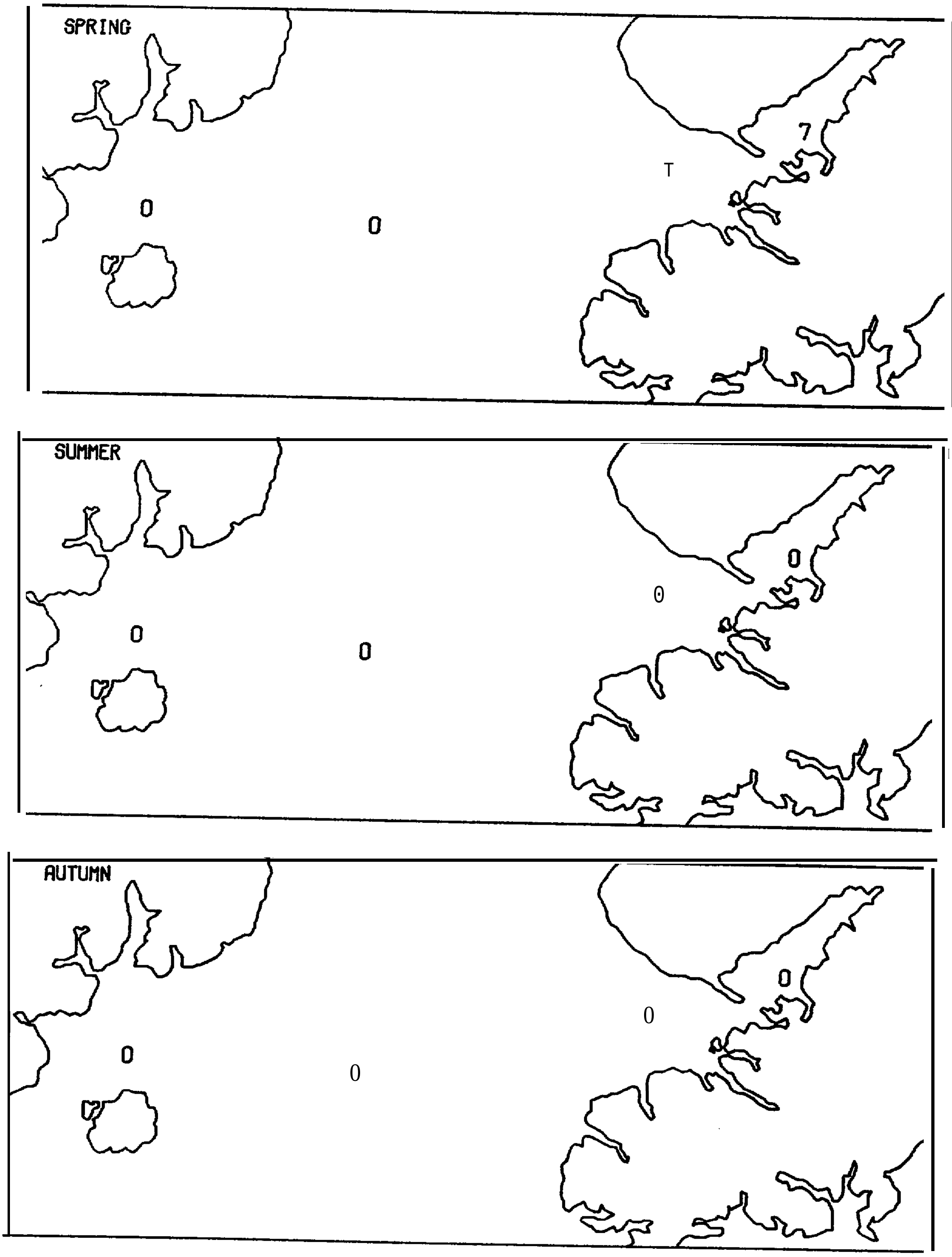
STAGE 111/10 SQ M



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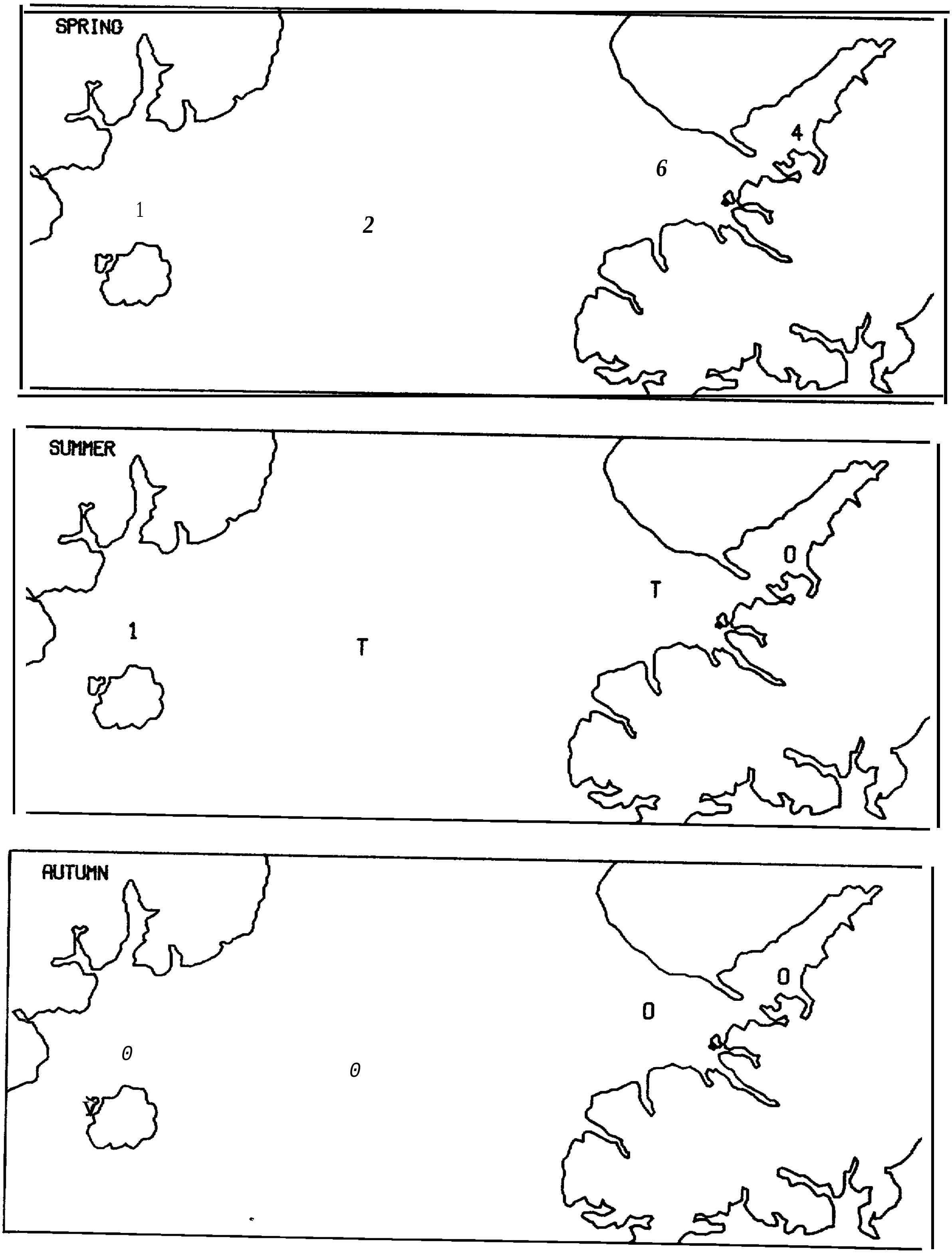
STAGE IV/10 SQ M



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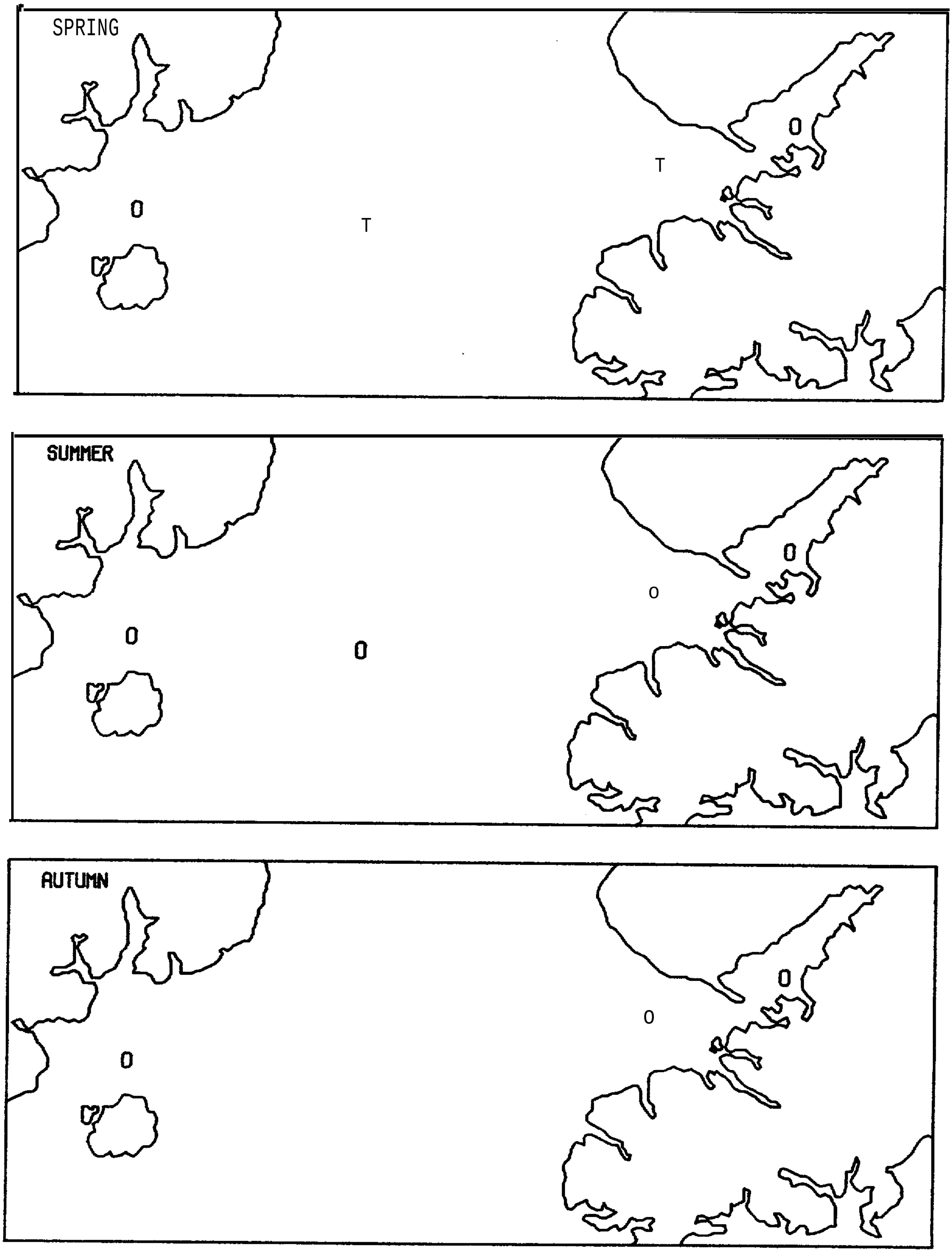
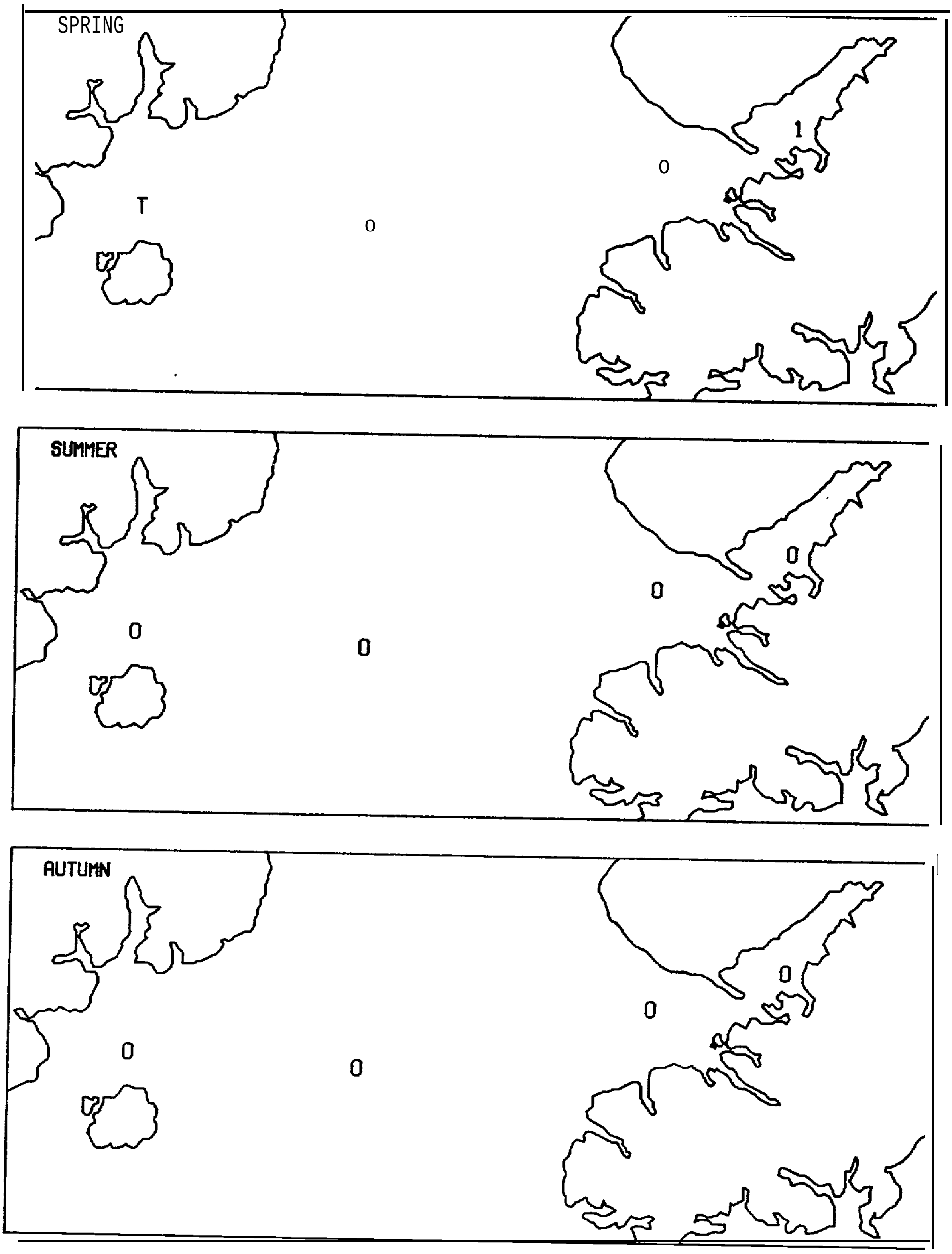
STAGE V/10 SQ M

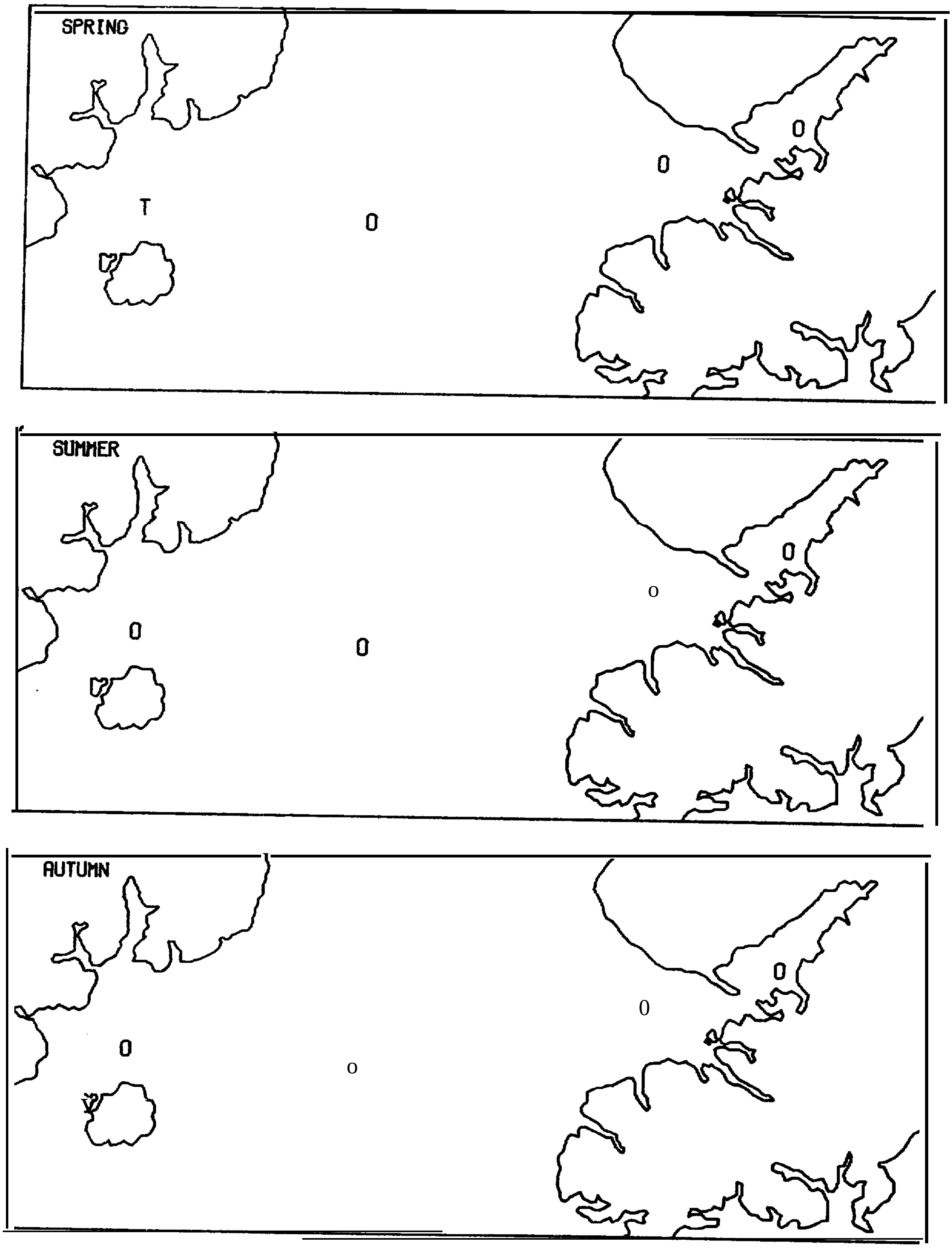


PANDALUS DANAE
STAGE II/10 SQ M

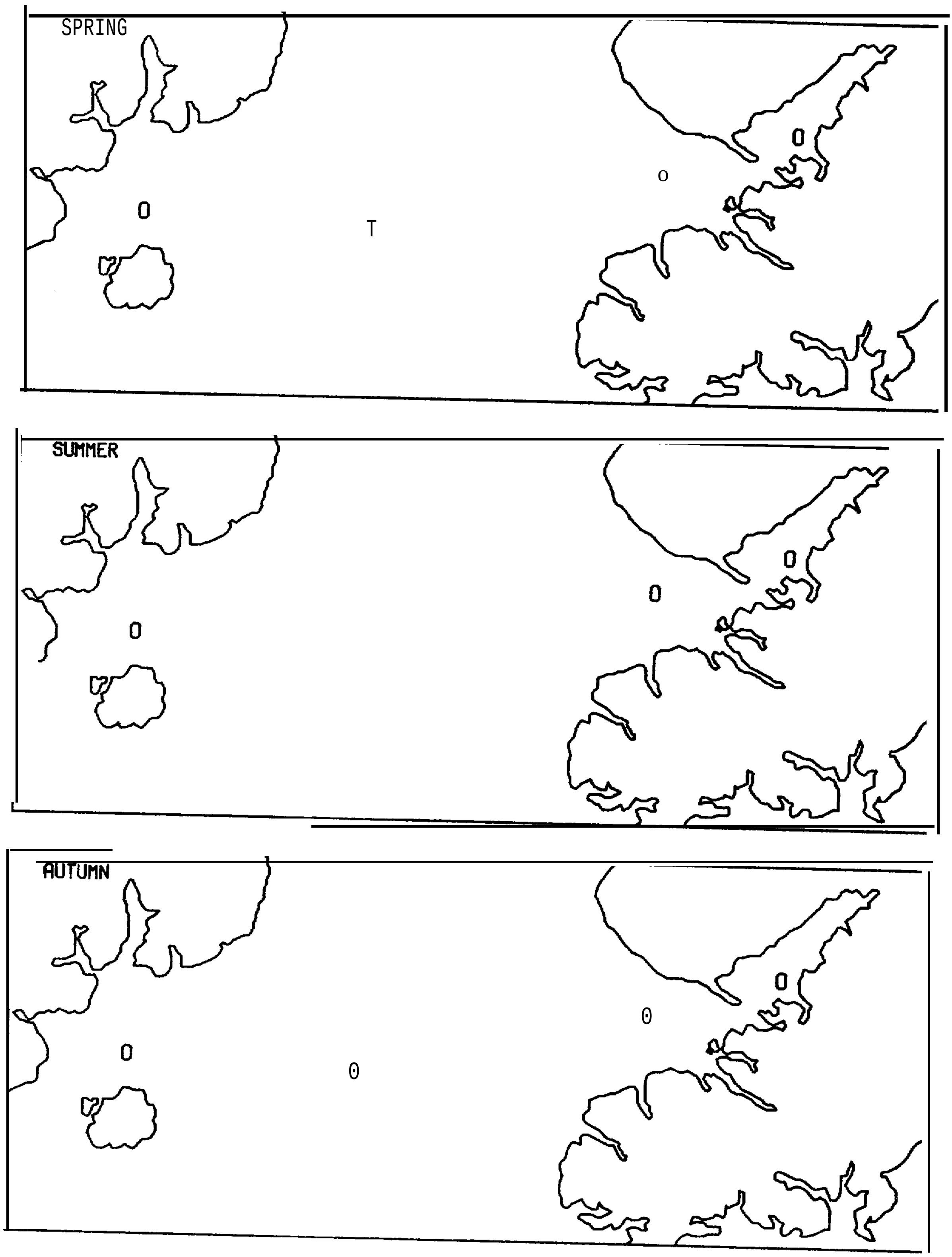


PANDALUS DANAE

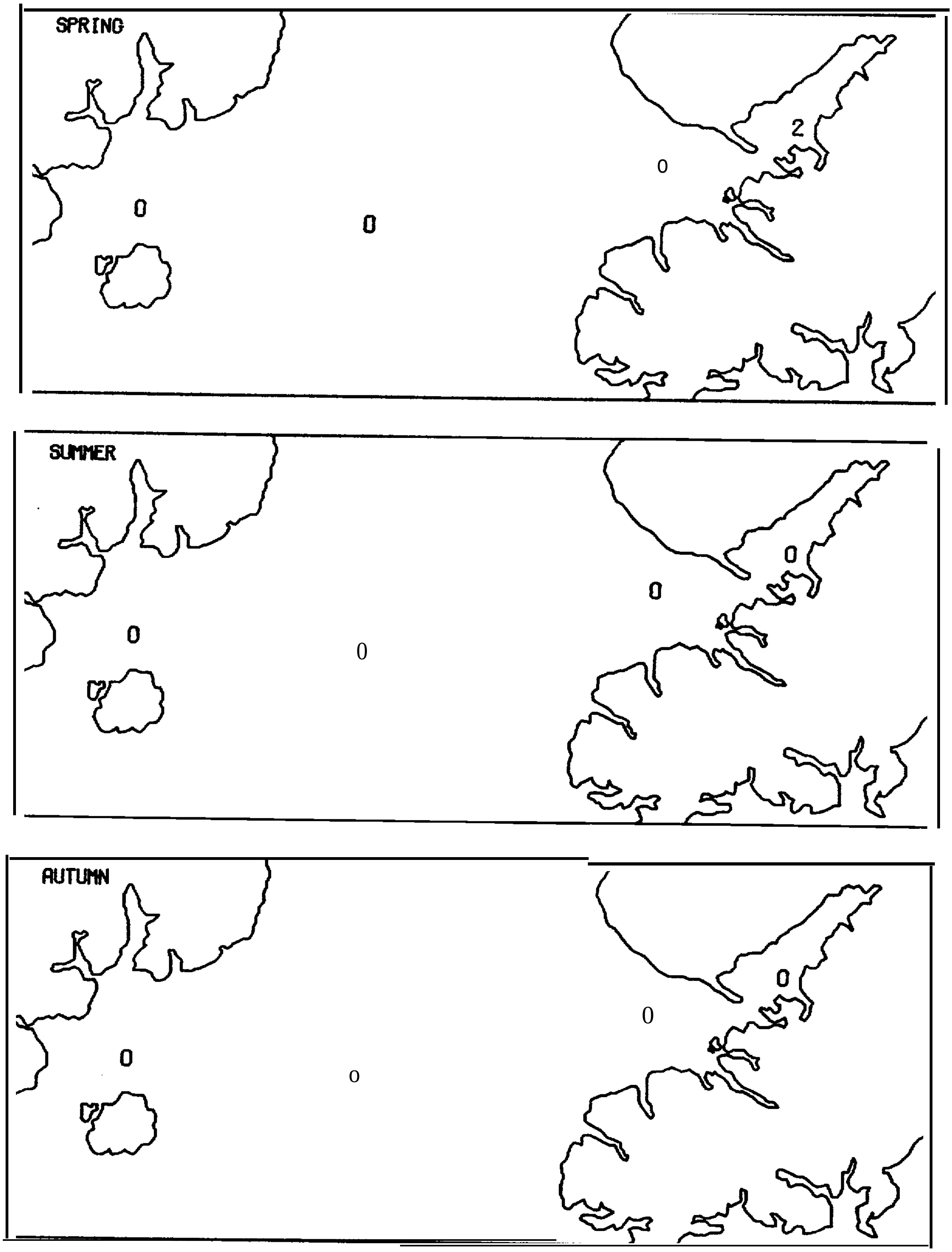
STAGE 111/10 SQ M



PANDALUS DANAE
STAGE V/10 SQ M



PANDALUS GONIURUS
STAGE 1/10 SQ M



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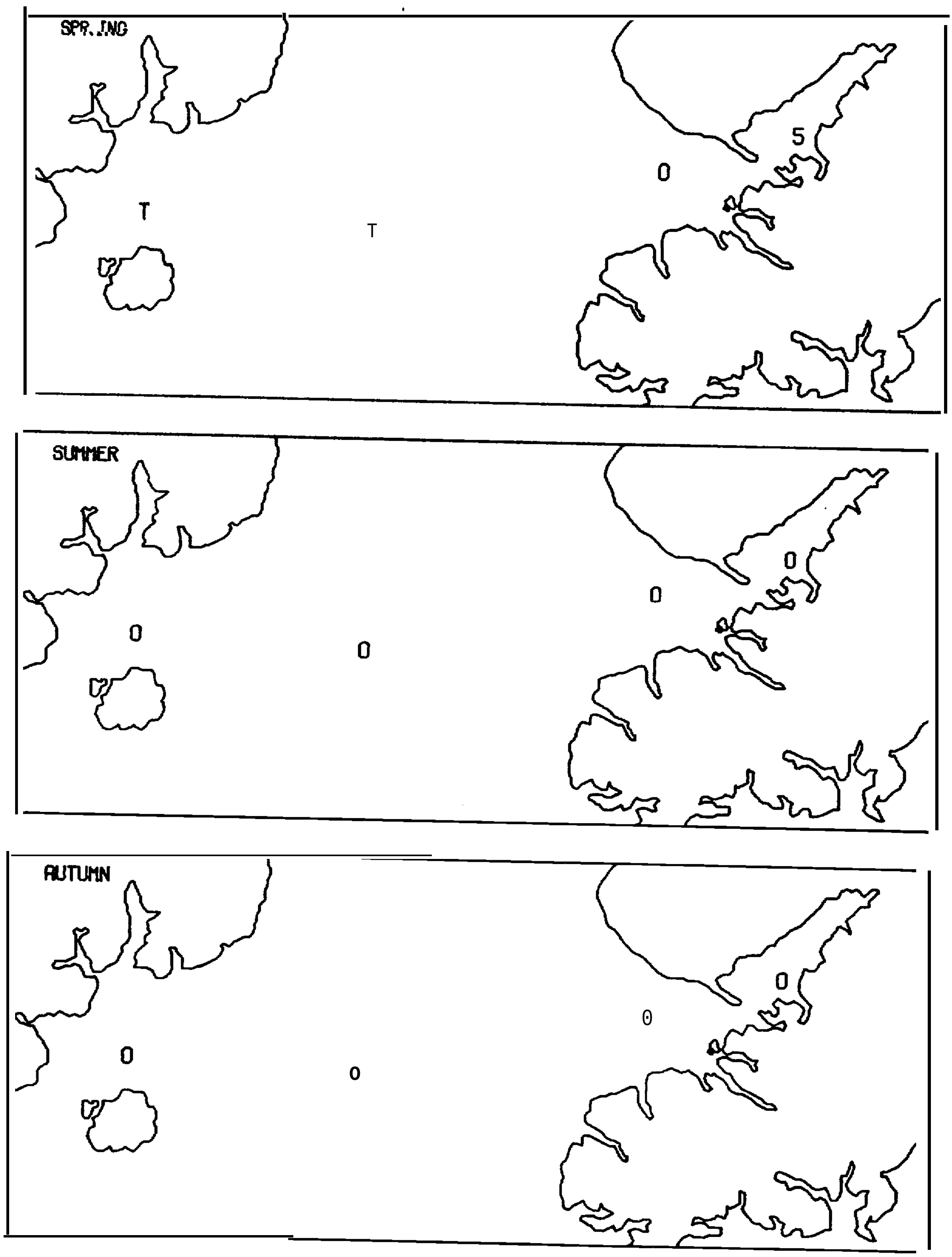
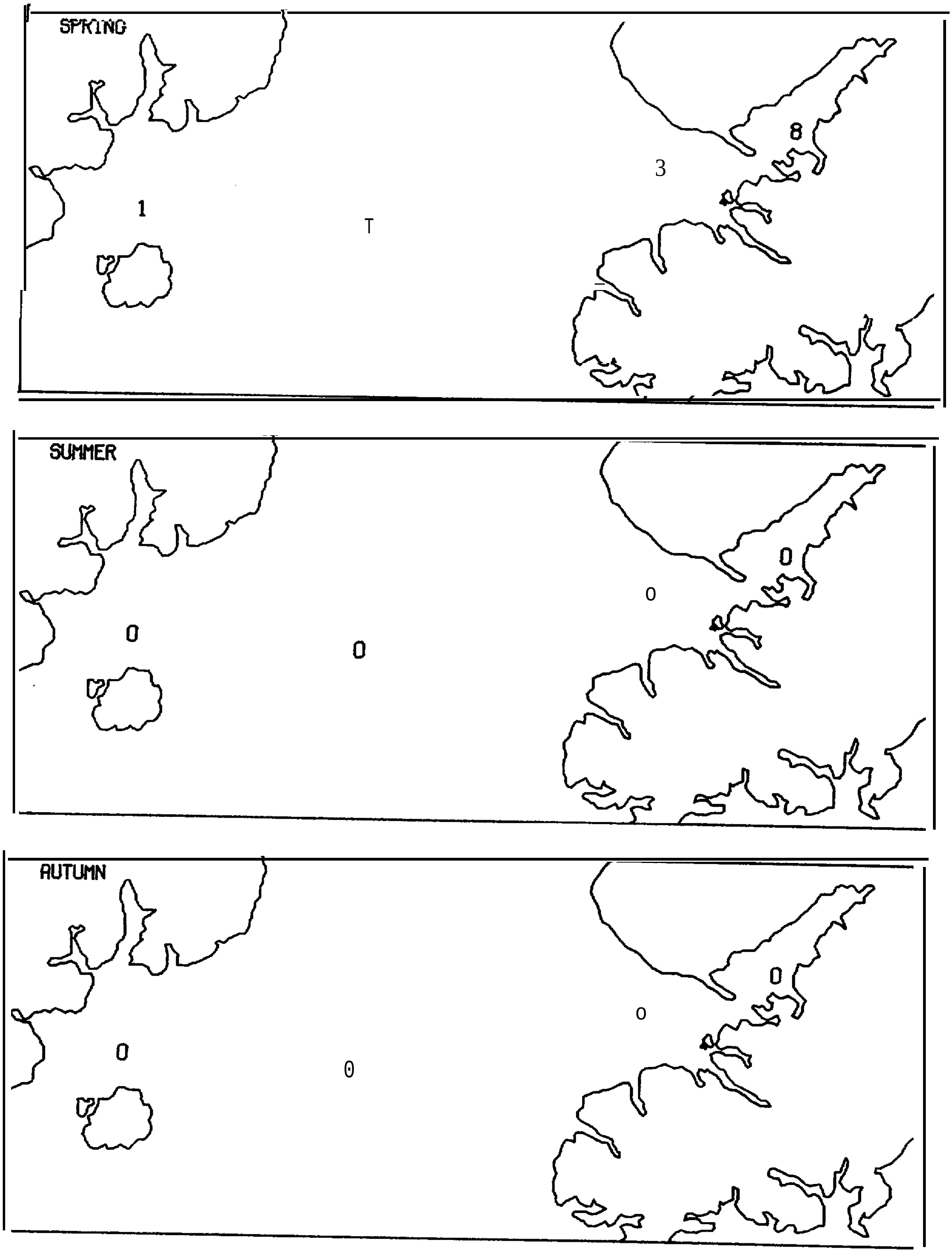
STAGE II/10 SQ M

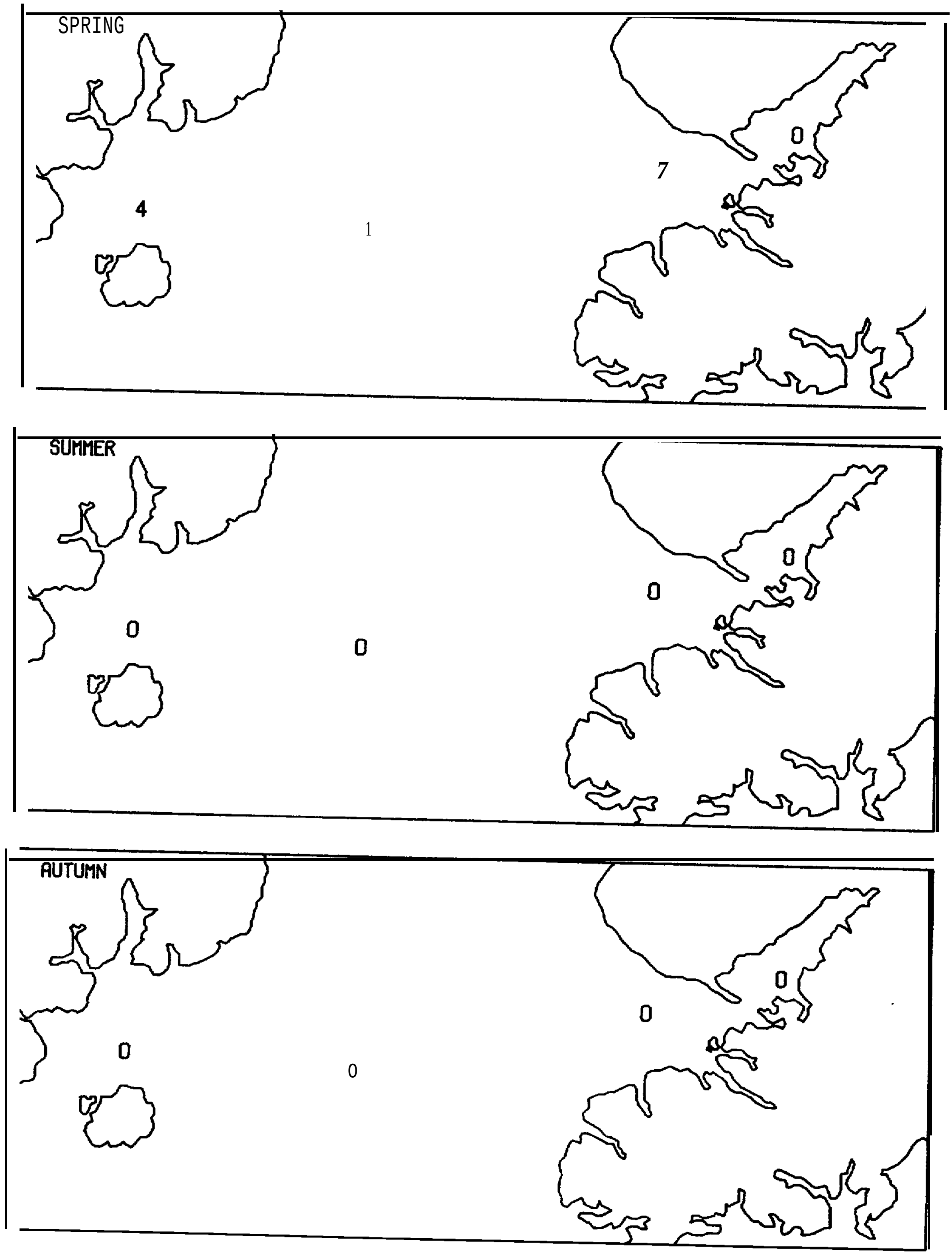


PANDALUS GONIURUS
STAGE 111/10 SQ M

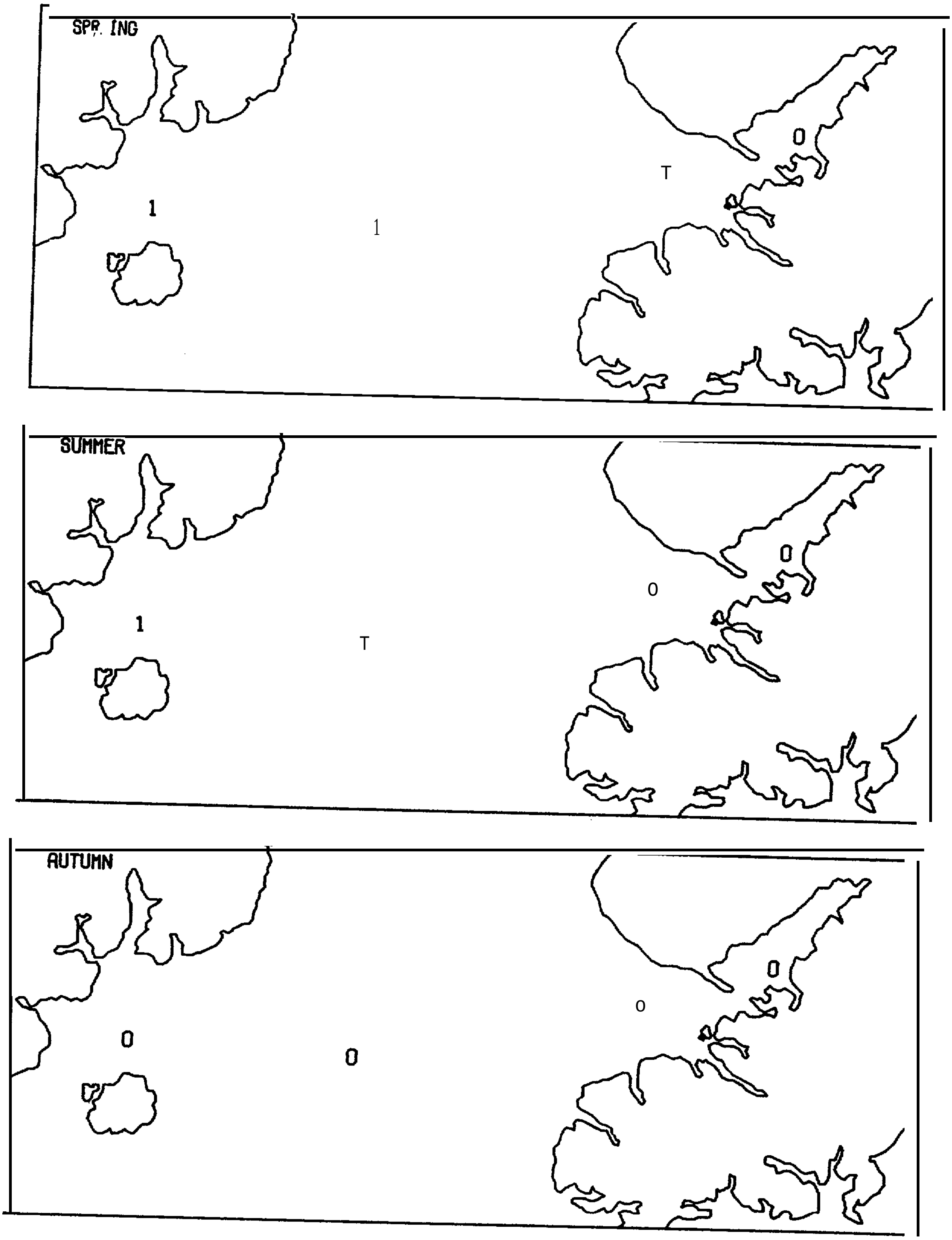


PANDALUS GONIURUS

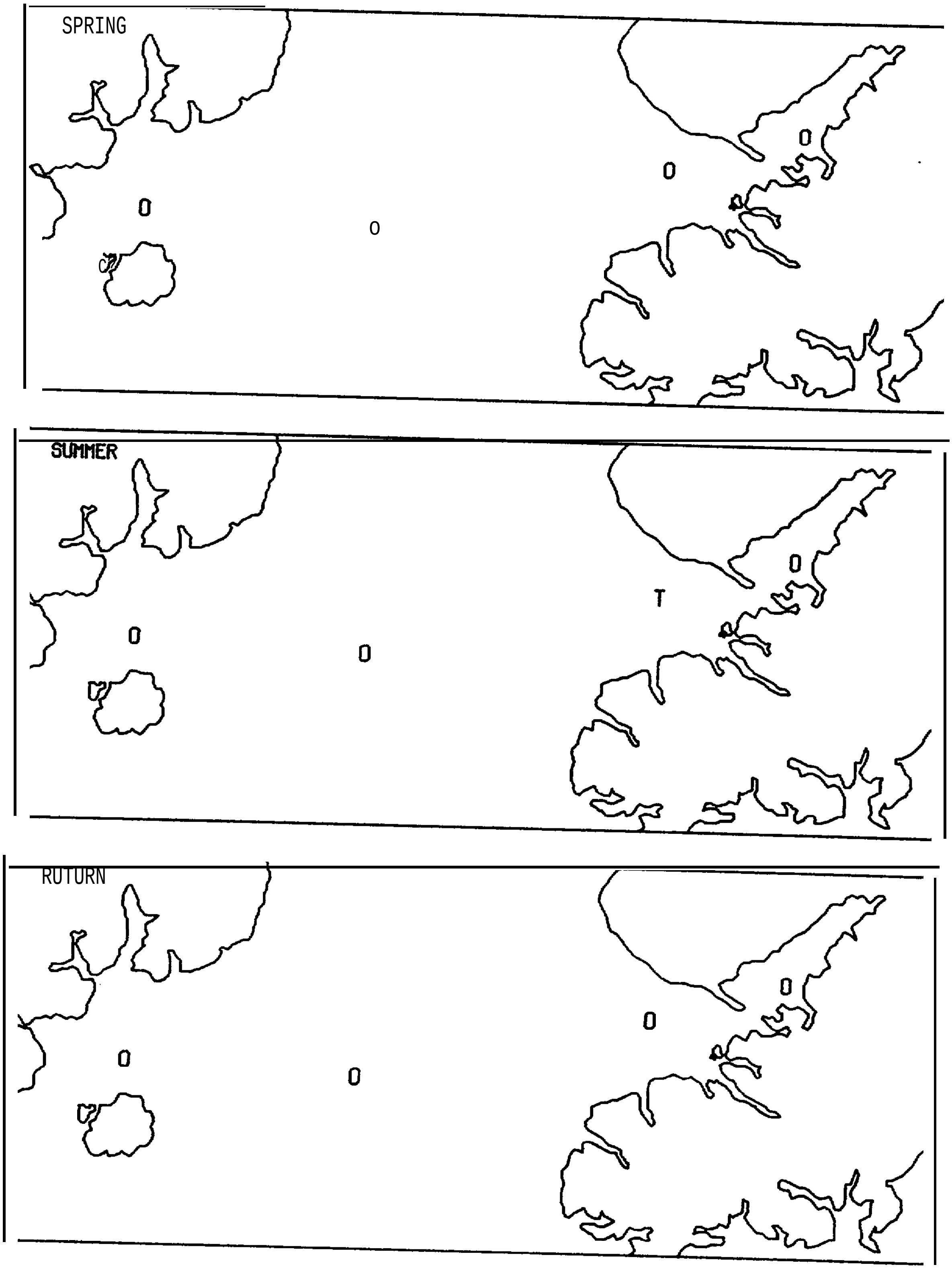
STAGE IV/10 SQ M



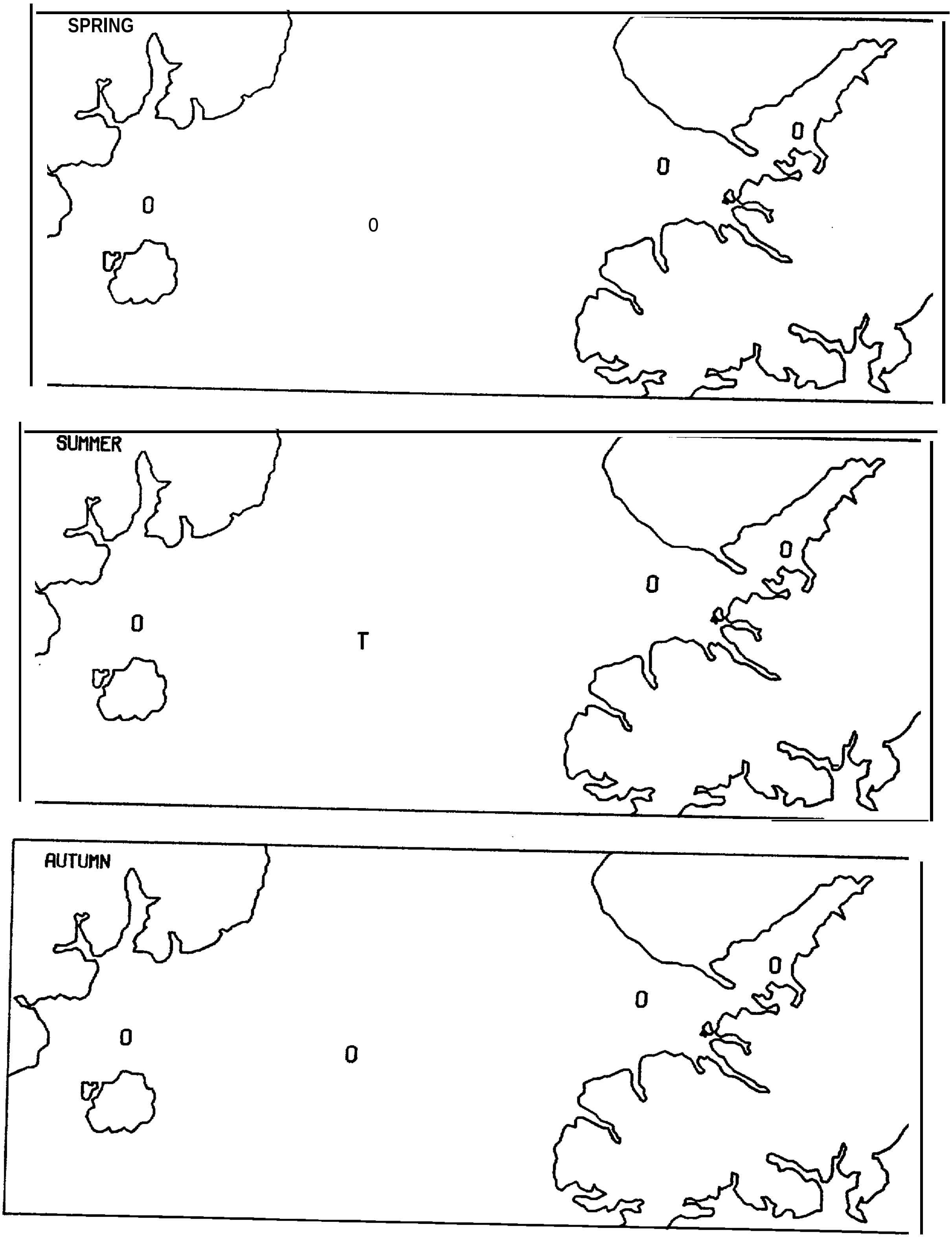
PANDALUS G(3N IURUS
STAGE V/I o SQ M



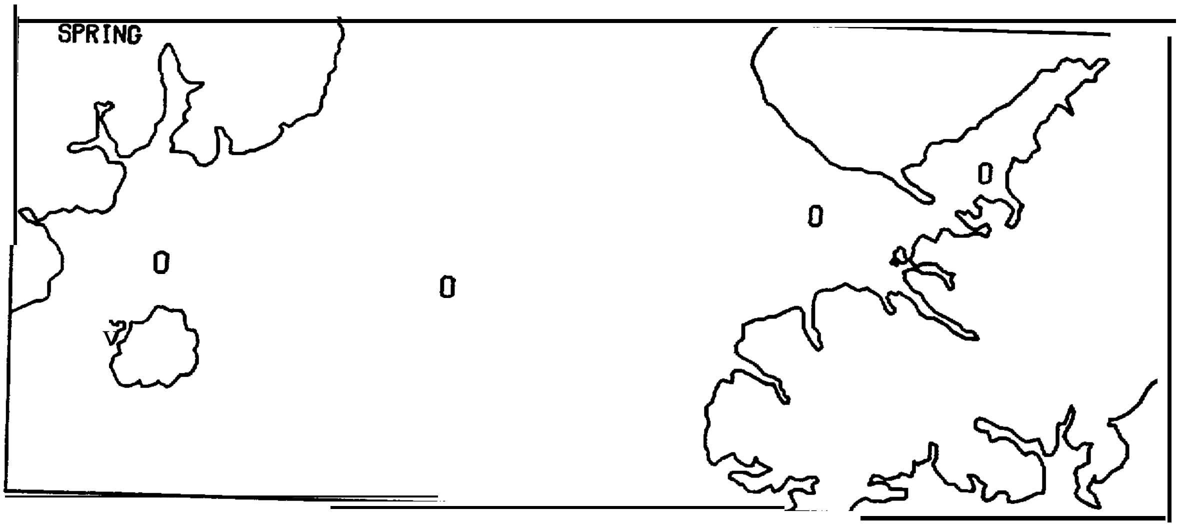
PANDALUS HYPSINOTUS
STAGE 11/10 SQ M

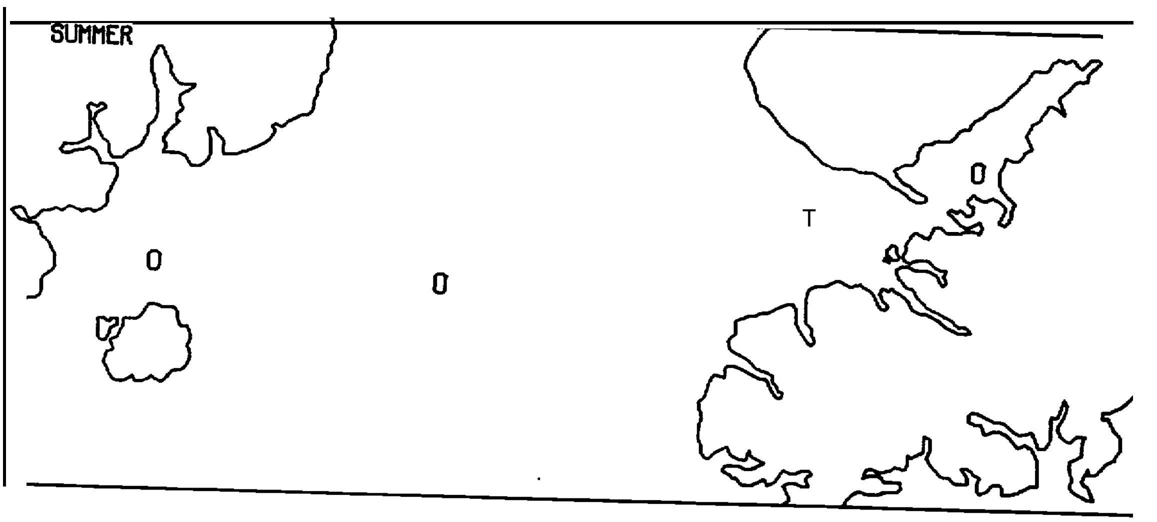


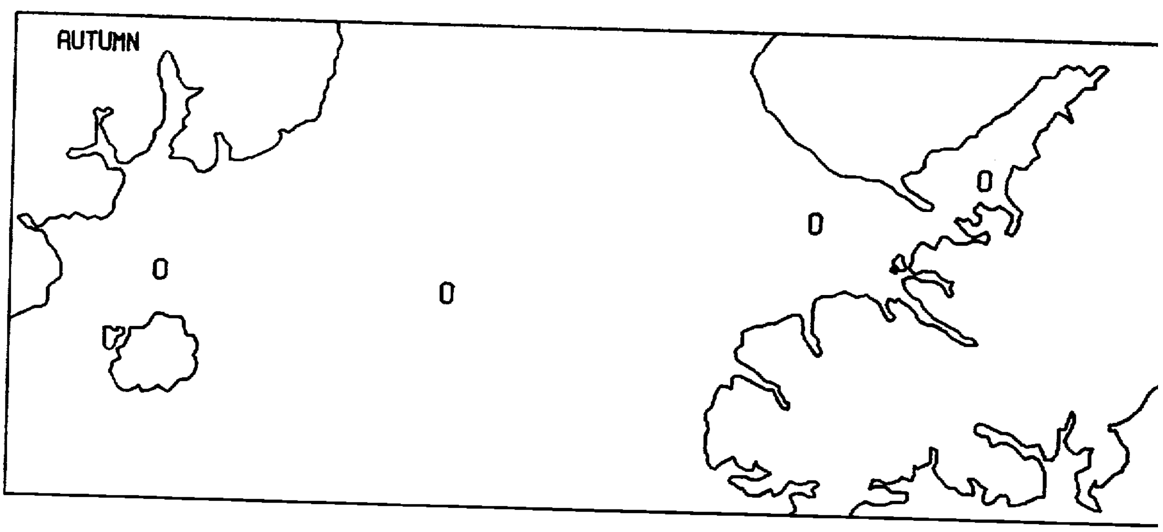
PANDALUS HYPSINOTUS
STAGE 111/10 SQ M



PANDALUS HYPSINOTUS
STAGE VI/10 SQ M

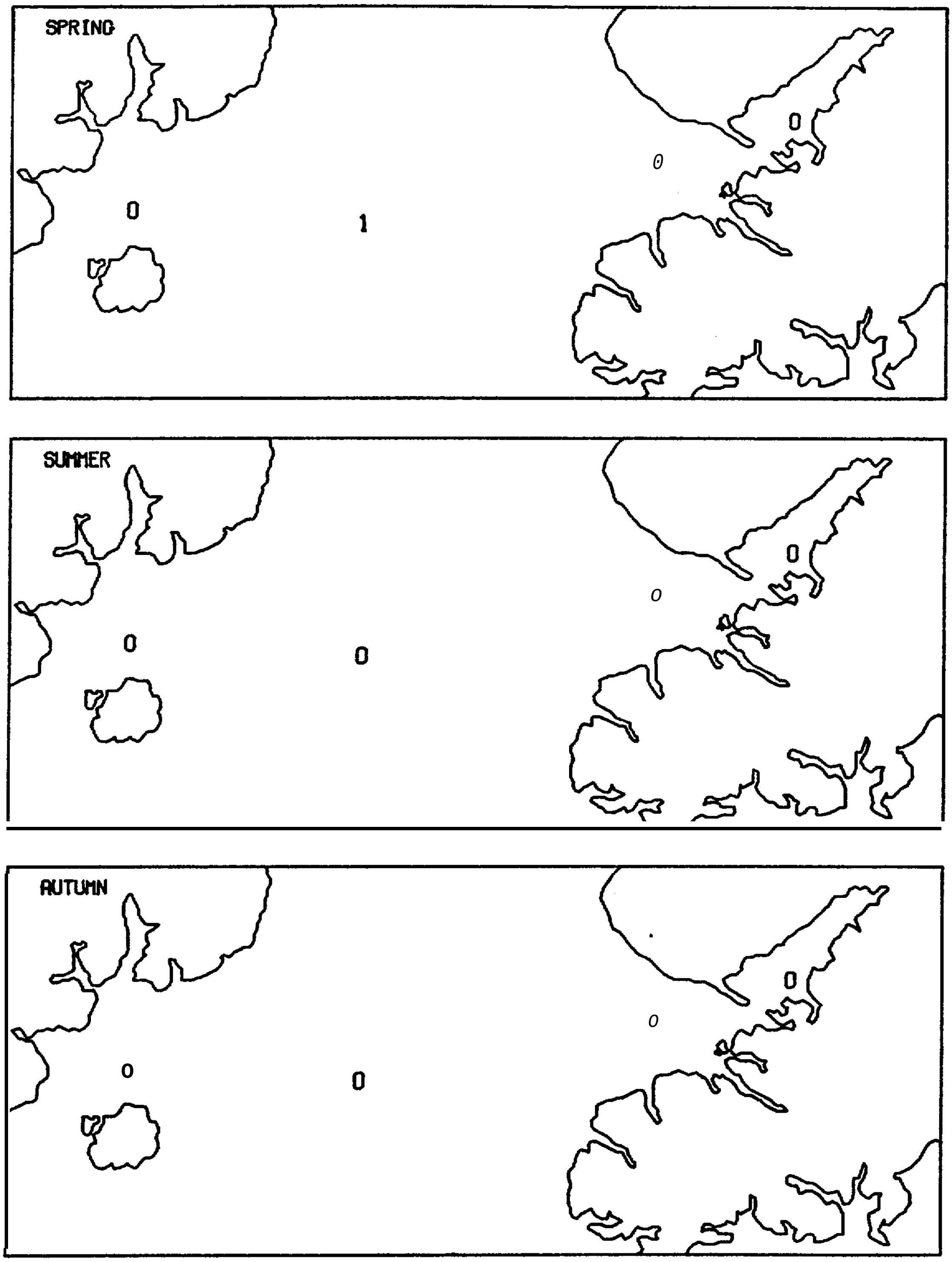




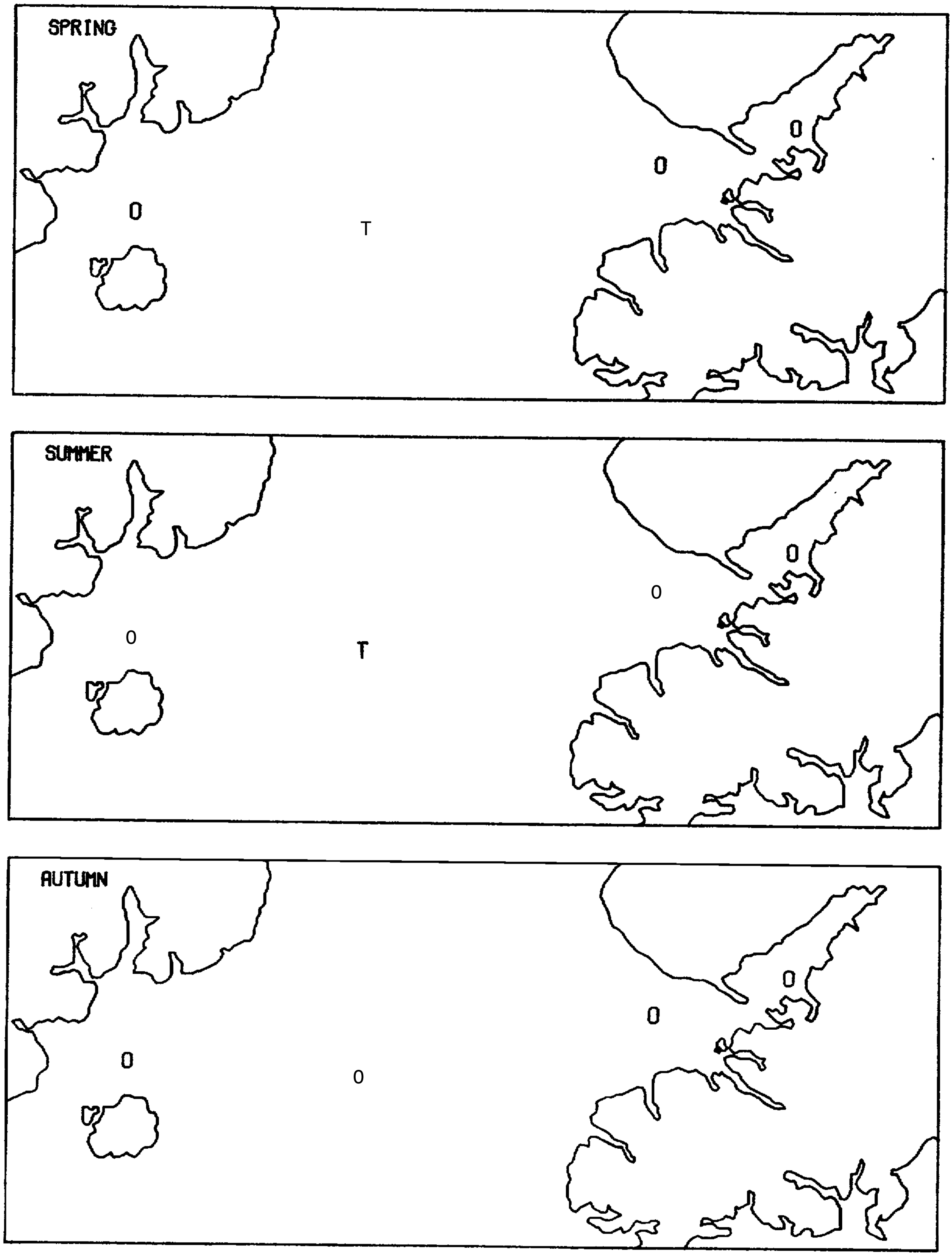


PANDALUS STENOLEPIS

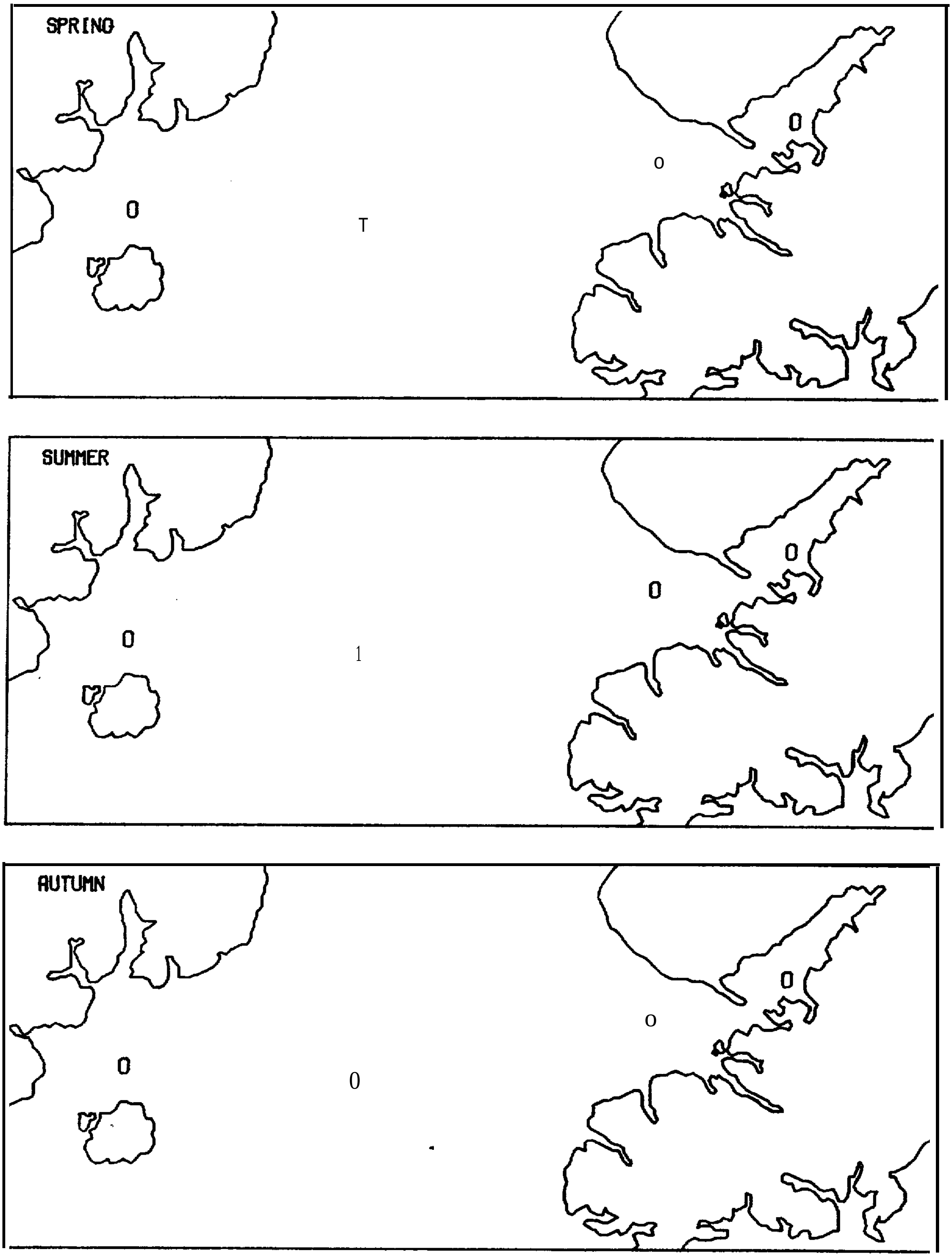
STAGE 1/10 SQ M



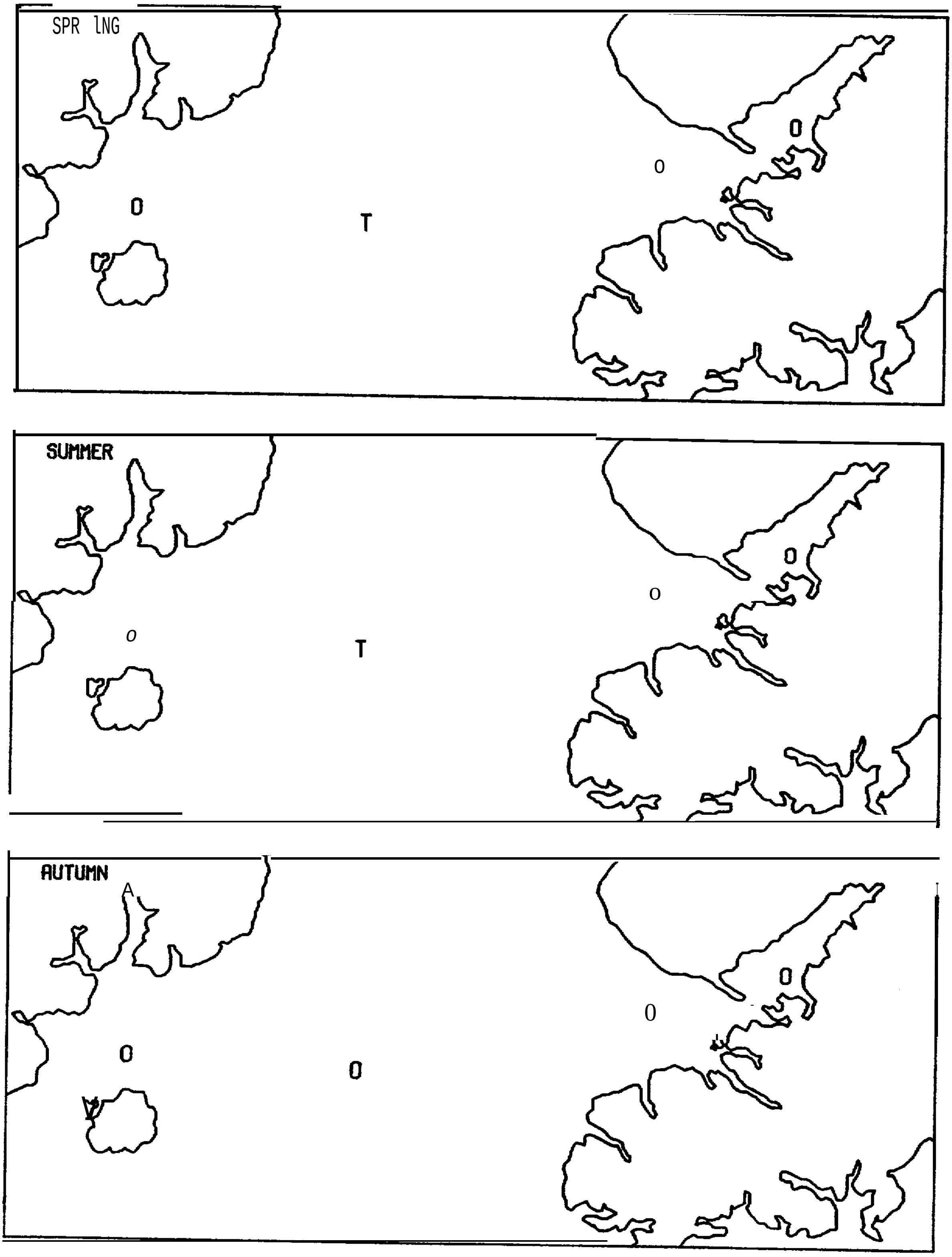
PANDALUS STENOLEPIS
STAGE 11/10 SQ M



PANDALUS STENOLEPIS
STAGE 111/10 SQ M

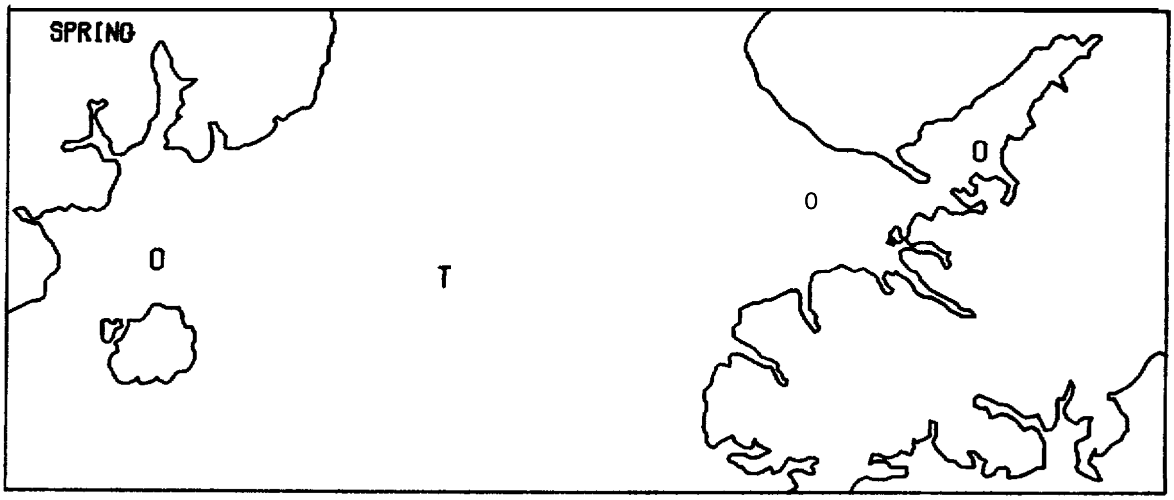


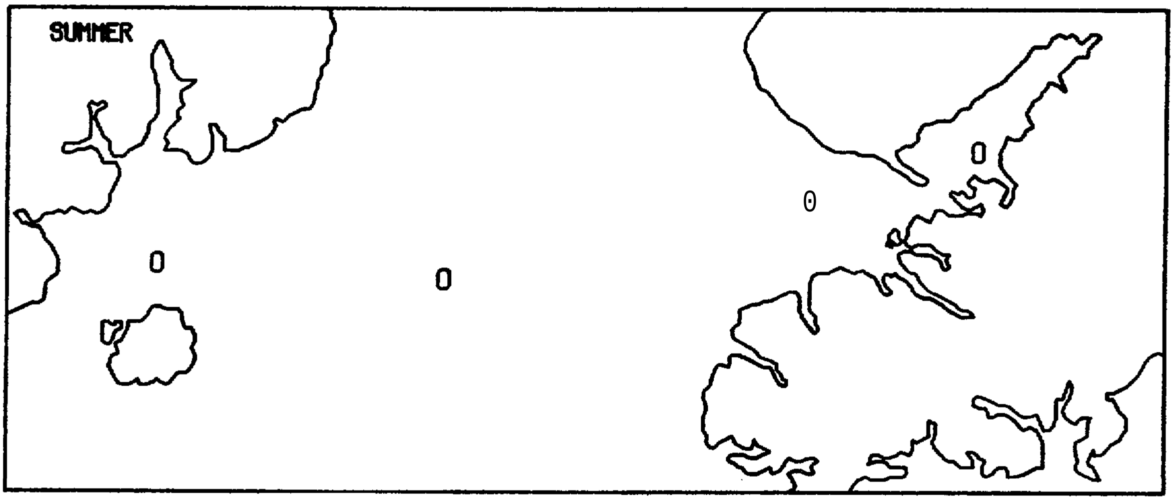
PANDALUS STENOLEPIS
STAGE IV/10 SQ M



PANDALUS MONTAGUI TRIDENS

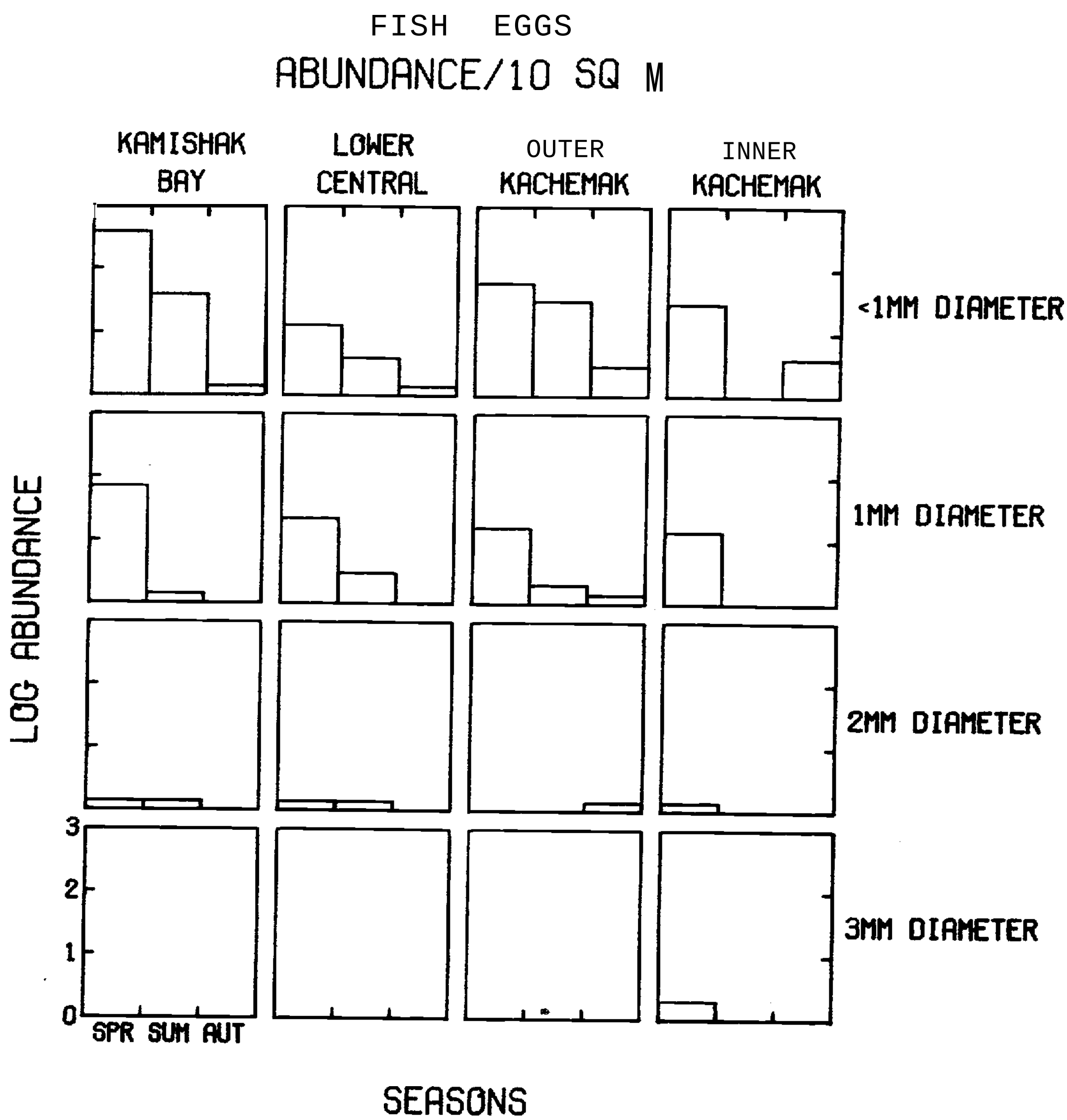
STAGE 111/10 SQ M



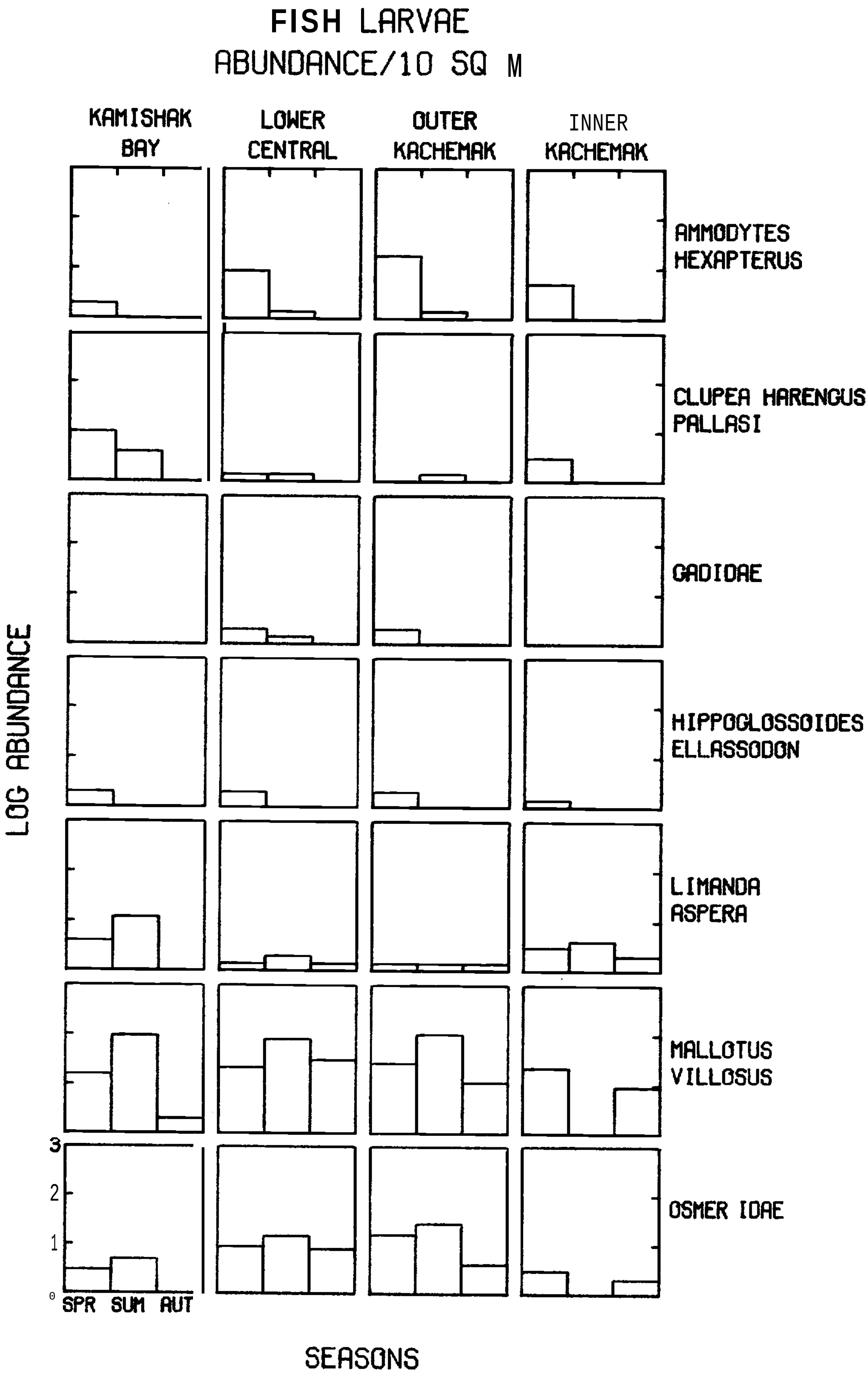


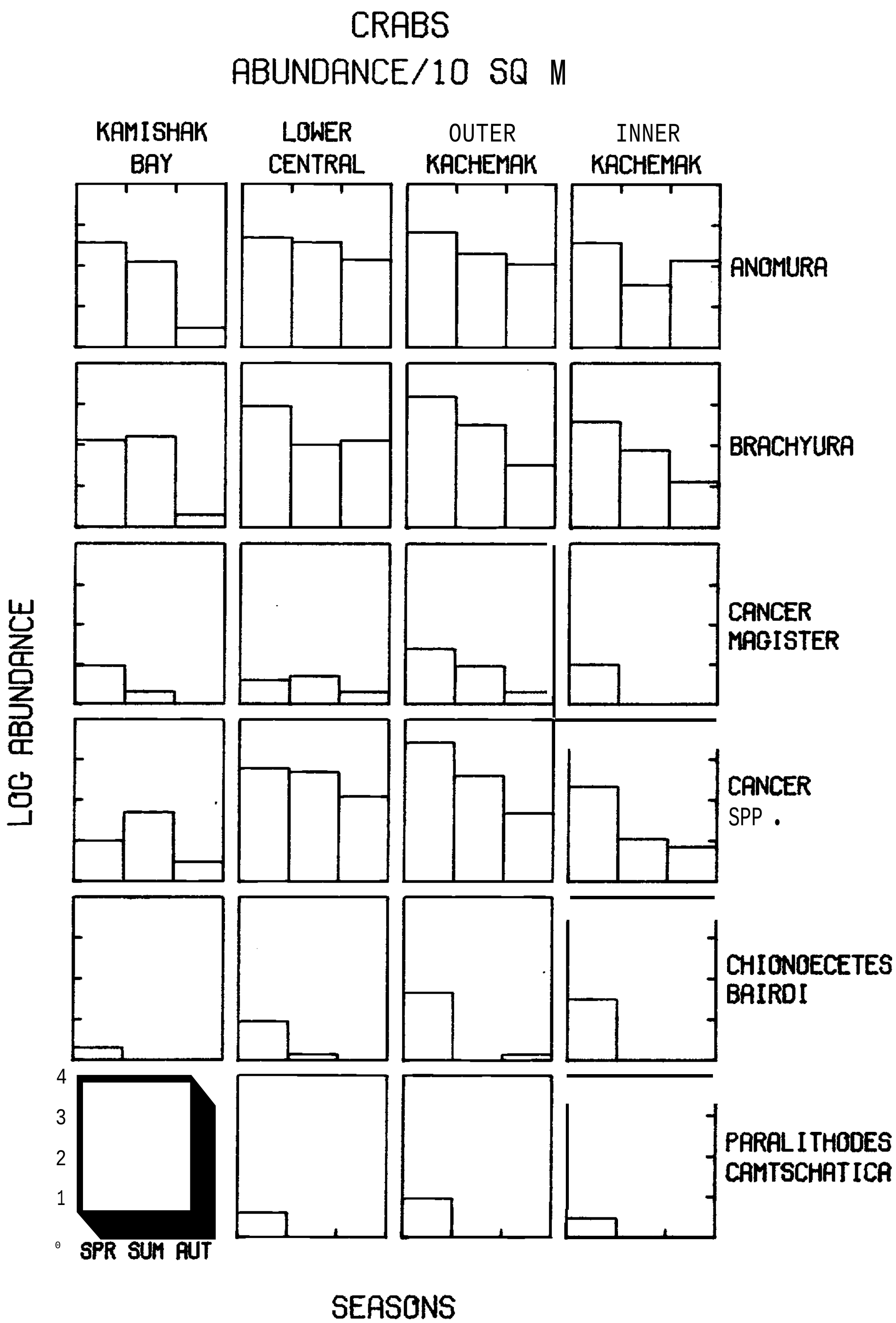
APPENDIX J

Temporal changes over three seasons in species composition and density in four areas, 1978.

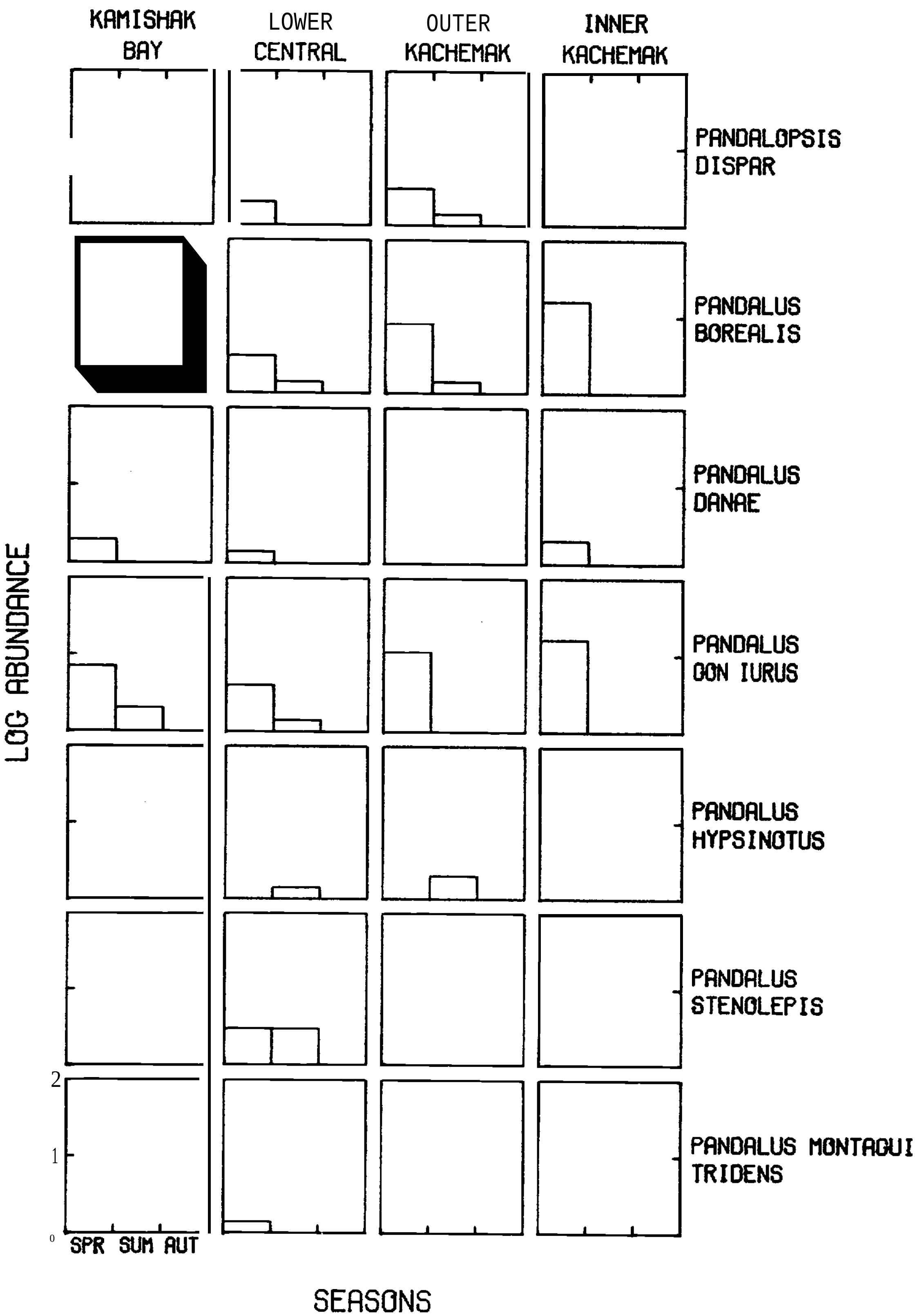


FISH EGGS
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
<1MM DIAMETER
1MM DIAMETER
2MM DIAMETER
3MM DIAMETER
LOG ABUNDANCE
3
2
1
0
SPR SUM AUT
SEASONS


FISH LARVAE
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
AMMODYTES HEXAPTERUS
CLUPEA HARENGUS PALLASI
GADIDAE
HIPPOGLOSSOIDES ELLASSODON
LIMANDA ASPERA
MALLOTUS VILLOSUS
OSMERIDAE
LOG ABUNDANCE
3
2
1
0
SPR SUM AUT
SEASONS


CRABS
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
ANOMURA
BRACHYURA
CANCER MAGISTER
CANCER SPP.
CHIONOECETES BAIRDI
PARALITHODES CAMTSCHATICA
LOG ABUNDANCE
4
3
2
1
0
SPR SUM AUT
SEASONS

SHRIMPS
ABUNDANCE/10 SQ M

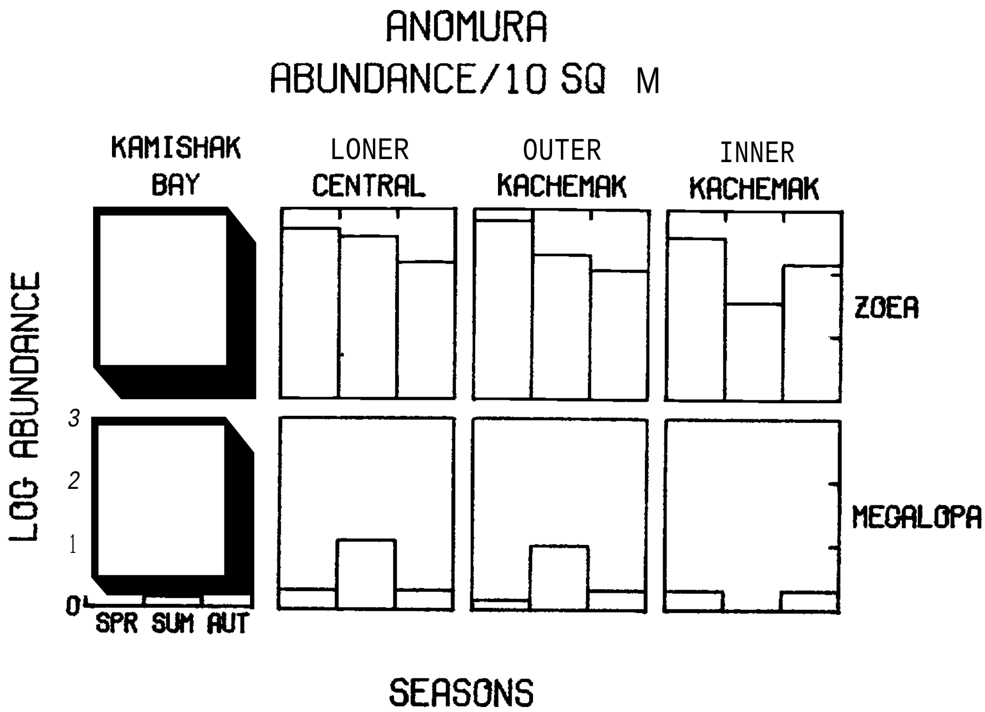


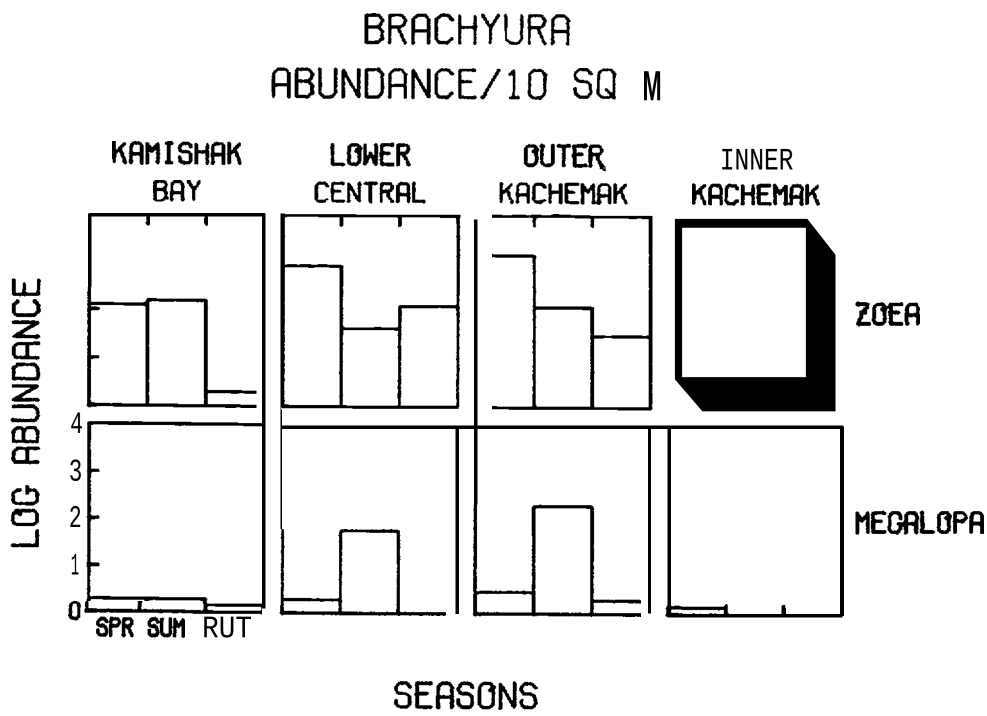
APPENDIX *K*

Temporal changes over three seasons

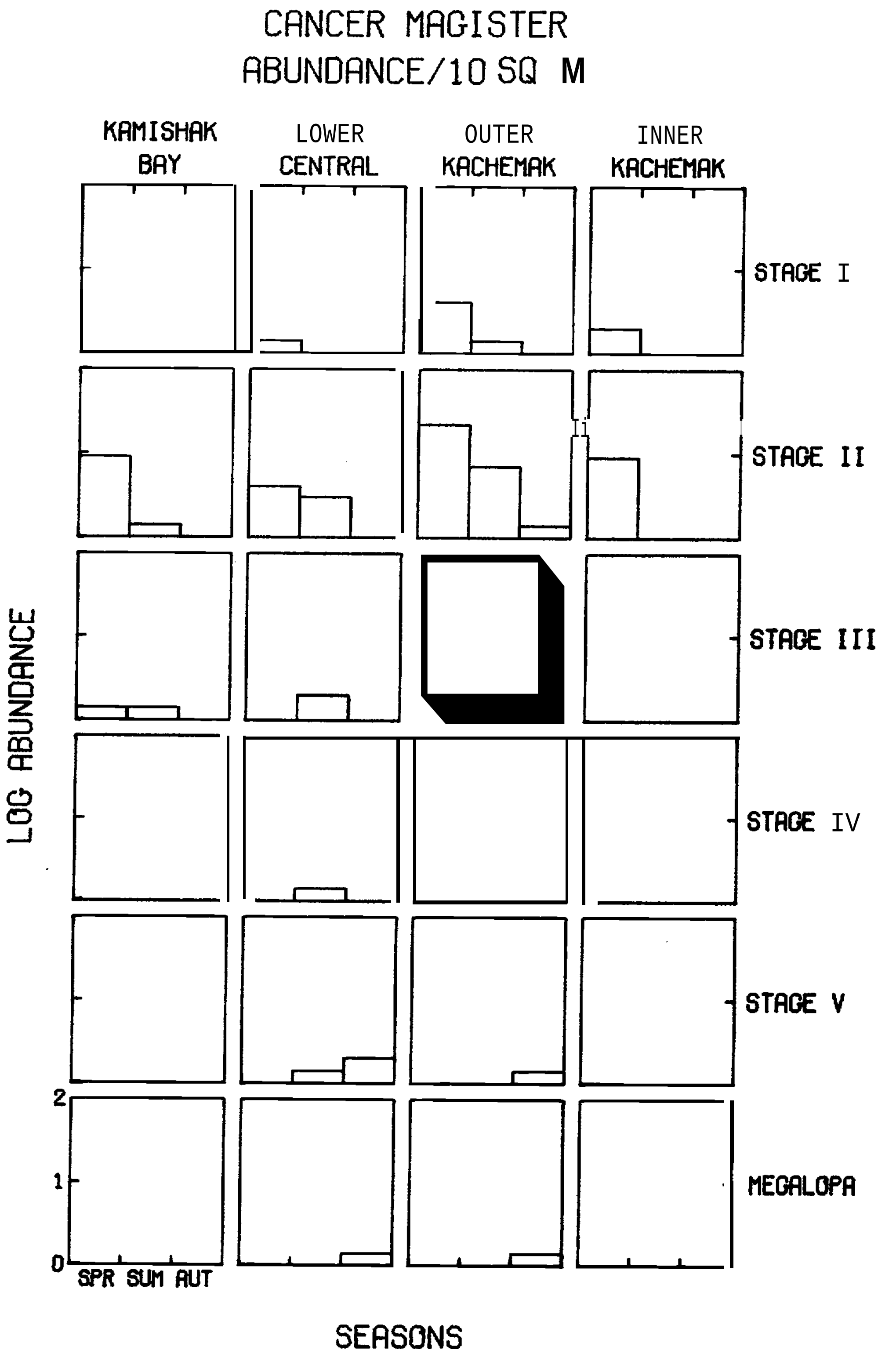
of relative abundance of life history stages

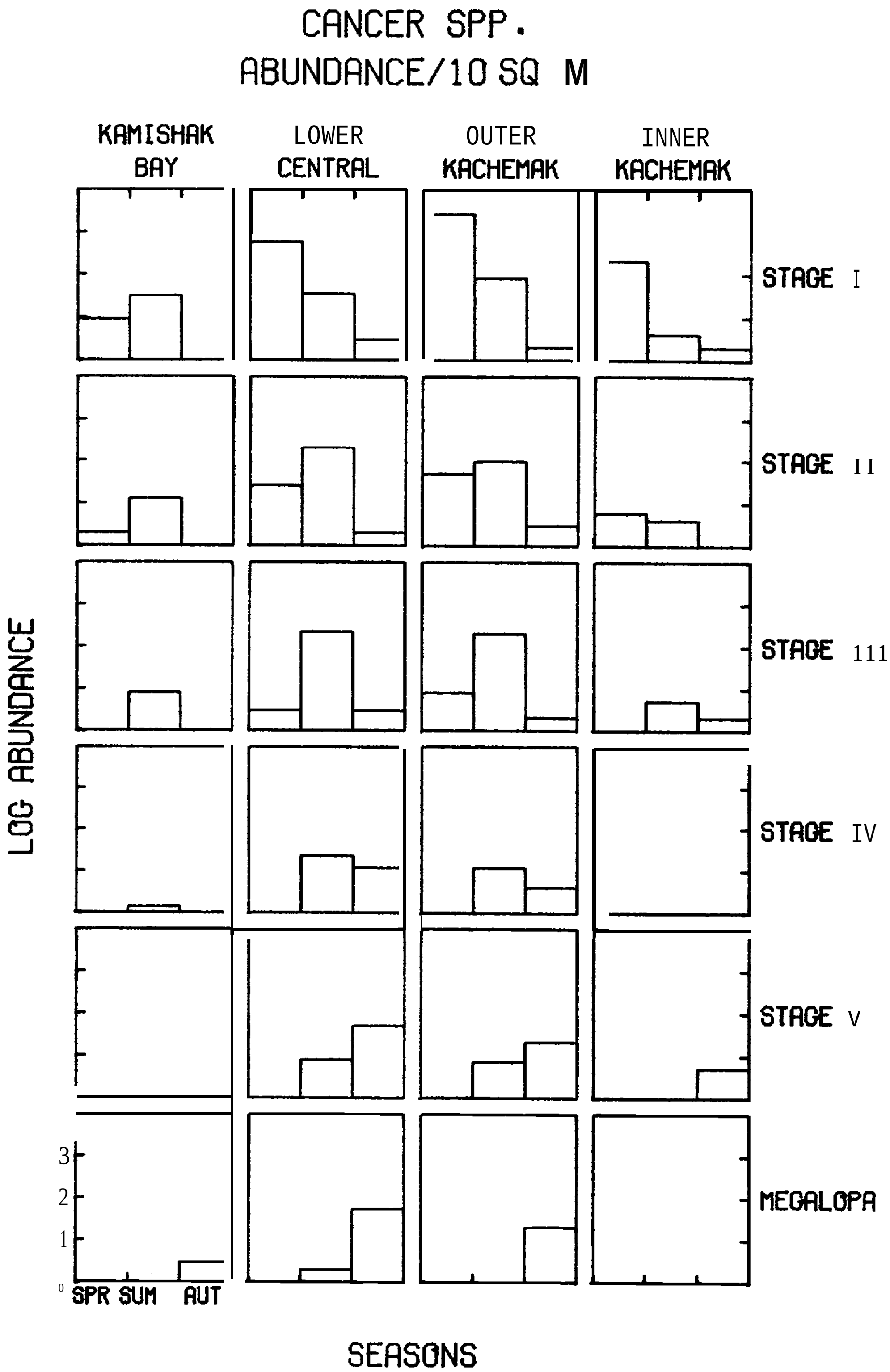
in four areas, 1978.

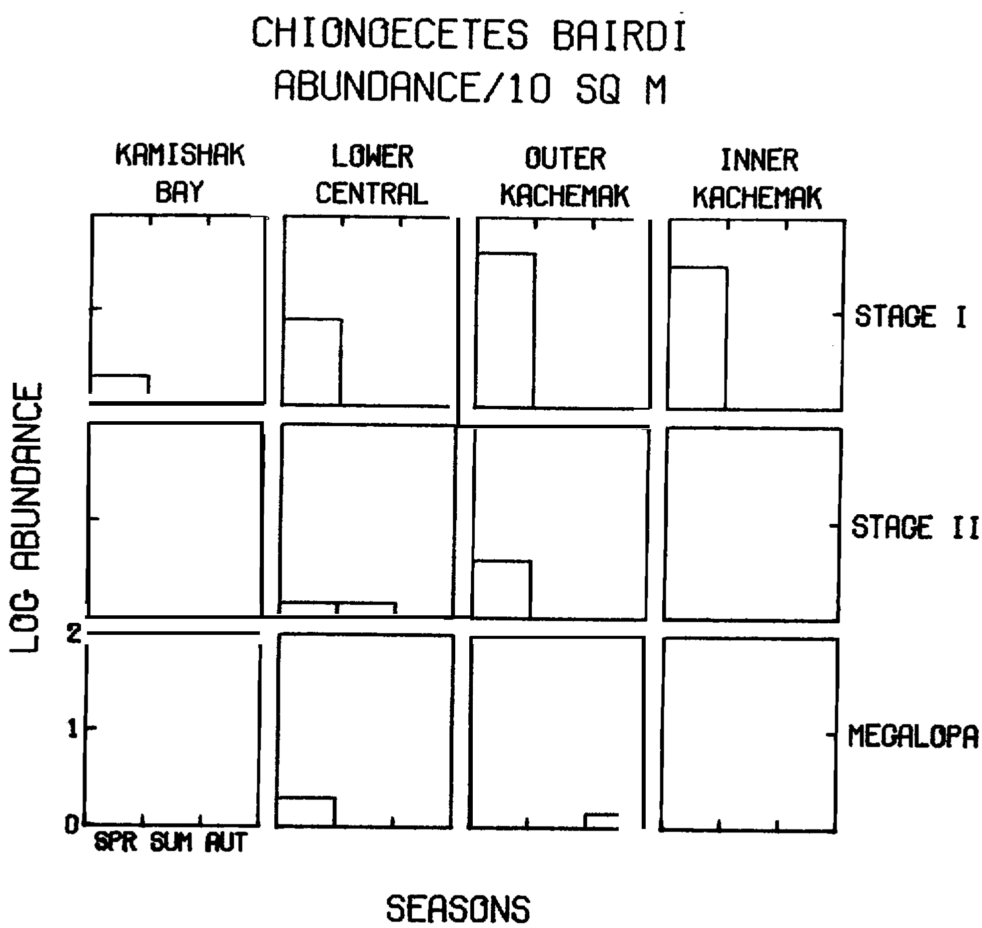

ANOMURA
ABUNDANCE/10 SQ M
KAMISHAK BAY
LONER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
ZOEA
MEGALOPA
LOG ABUNDANCE
3
2
1
0
SPR SUM AUT
SEASONS



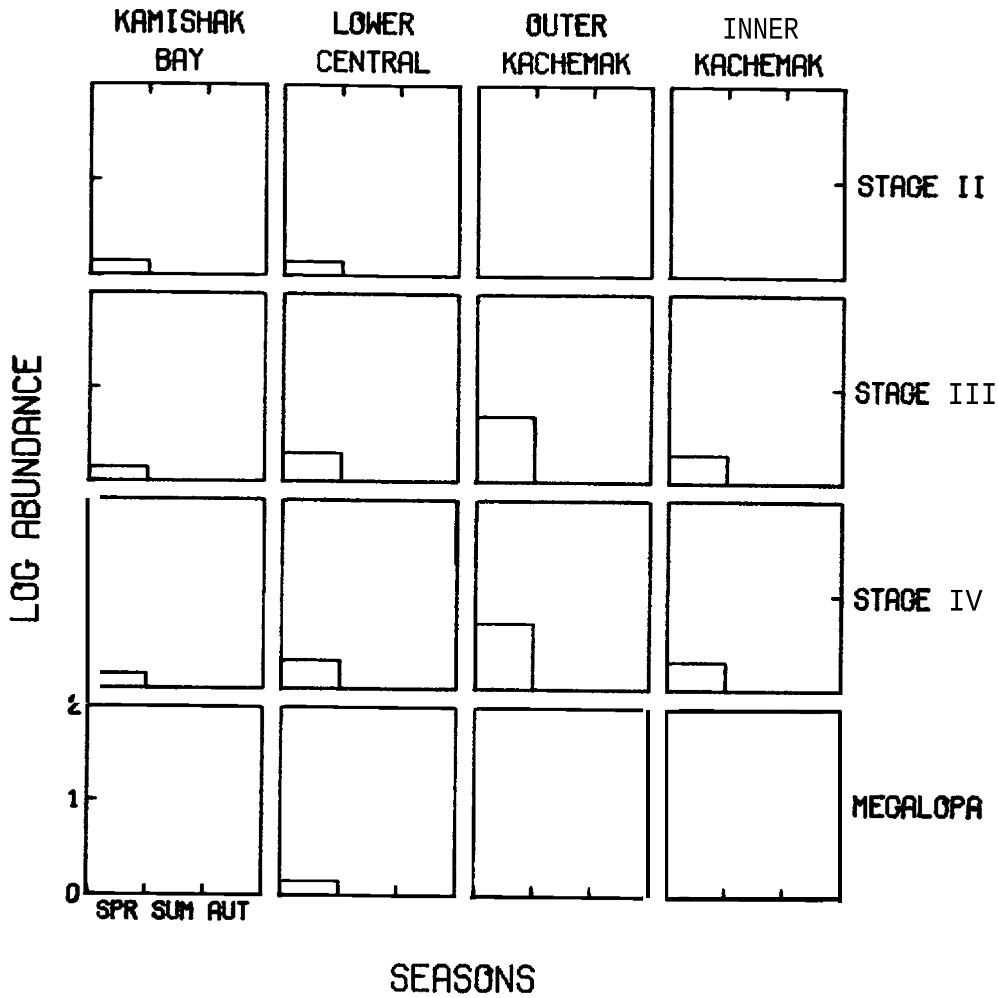
BRACHYURA
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
ZOEA
MEGALOPA
LOG ABUNDANCE
0
1
2
3
4
SPR
SUM
AUT
SEASONS

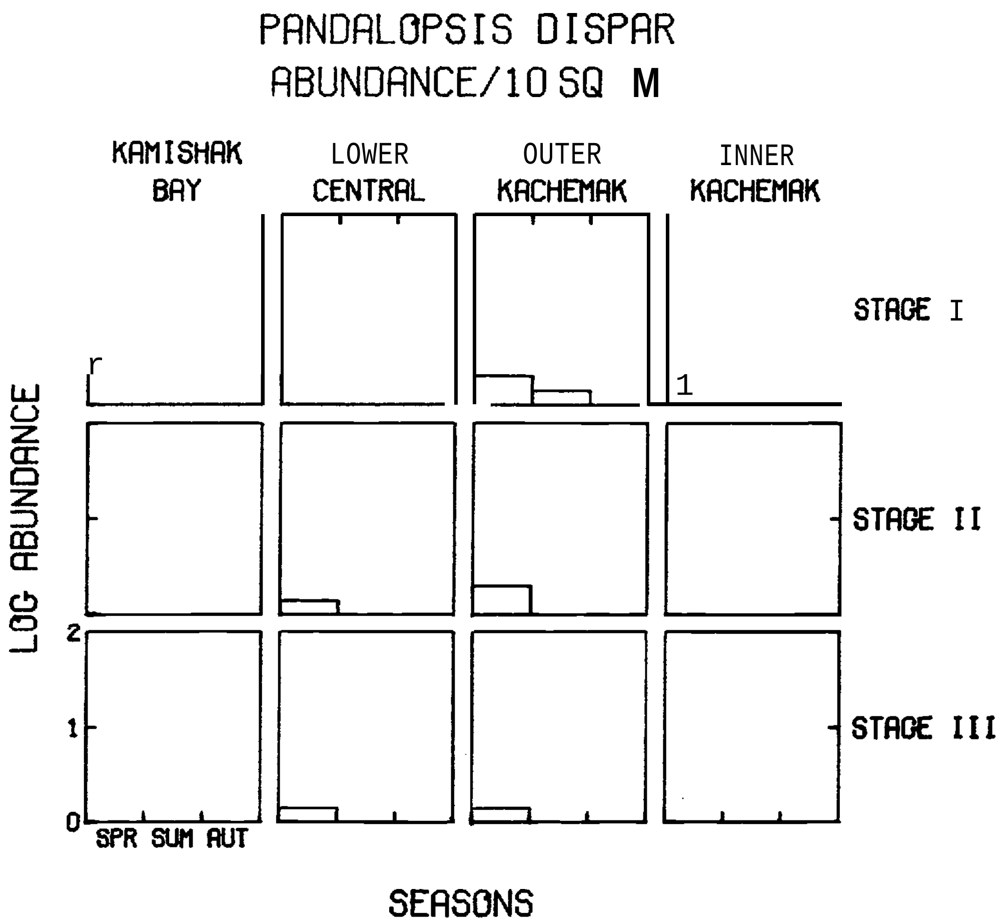

CANCER MAGISTER
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE I
STAGE II
STAGE III
STAGE IV
STAGE V
MEGALOPA
LOG ABUNDANCE
2
1
0
SPR SUM AUT
SEASONS

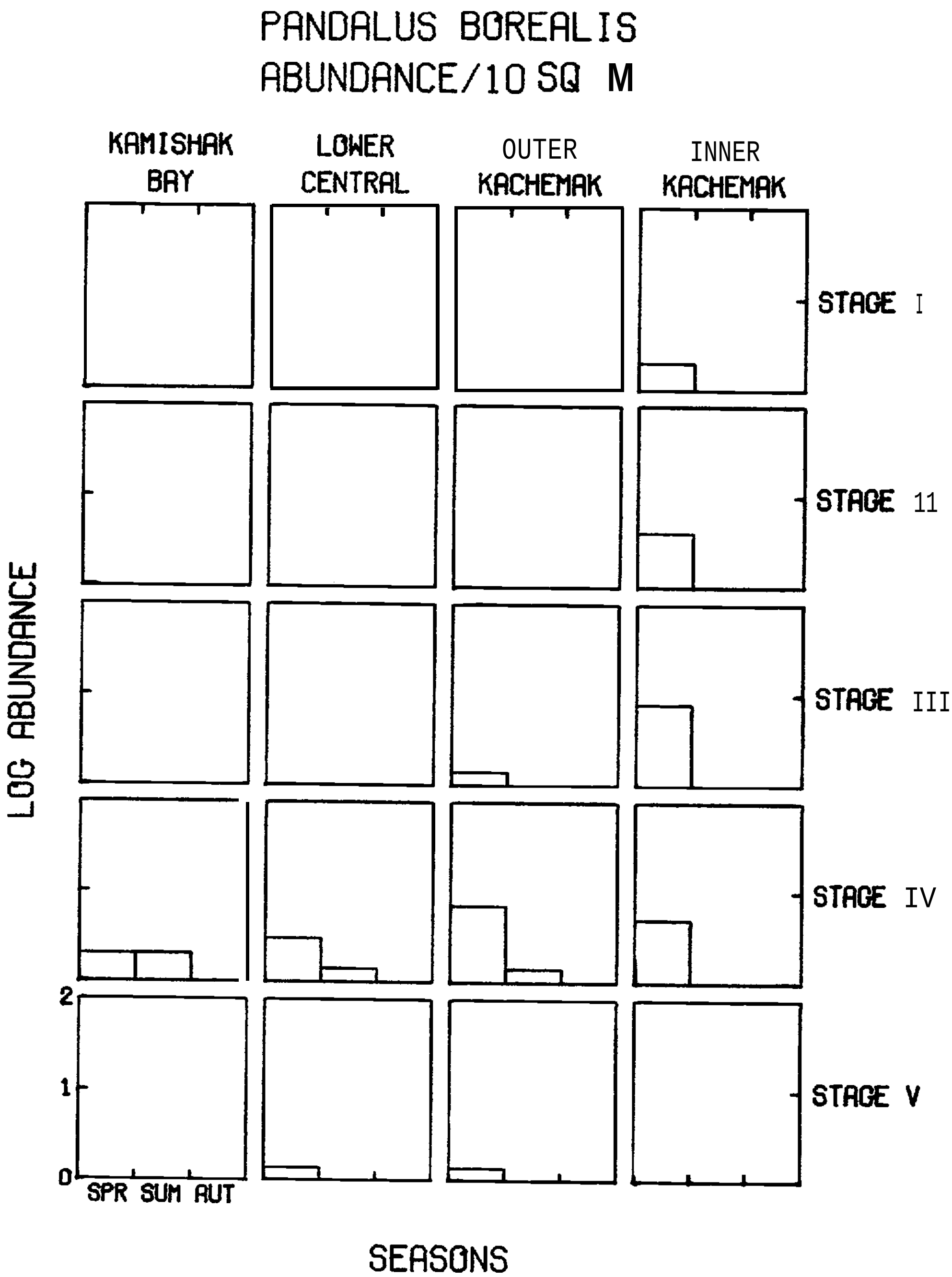

CANCER SPP.
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE I
STAGE II
STAGE 111
STAGE IV
STAGE V
MEGALOPA
LOG ABUNDANCE
3
2
1
0
SPR SUM AUT
SEASONS

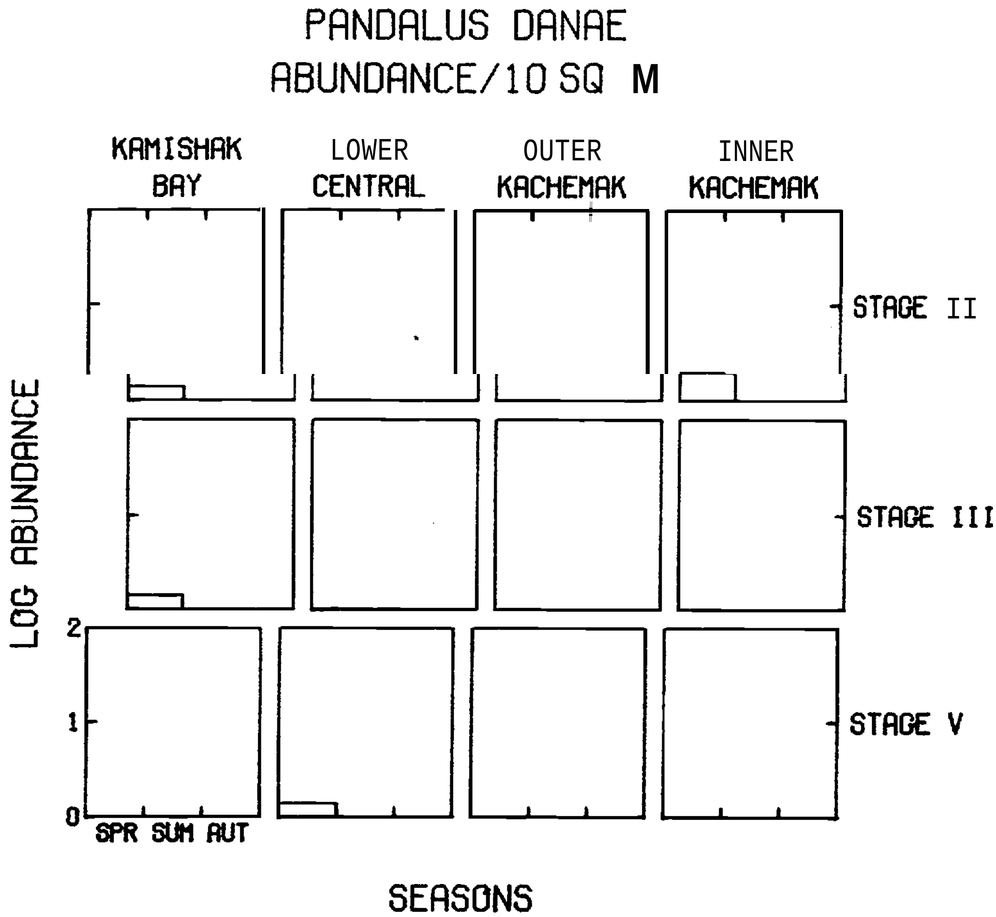

CHIONOECETES BAIRDI
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE I
STAGE II
MEGALOPA
LOG ABUNDANCE
2
1
0
SPR SUM AUT
SEASONS

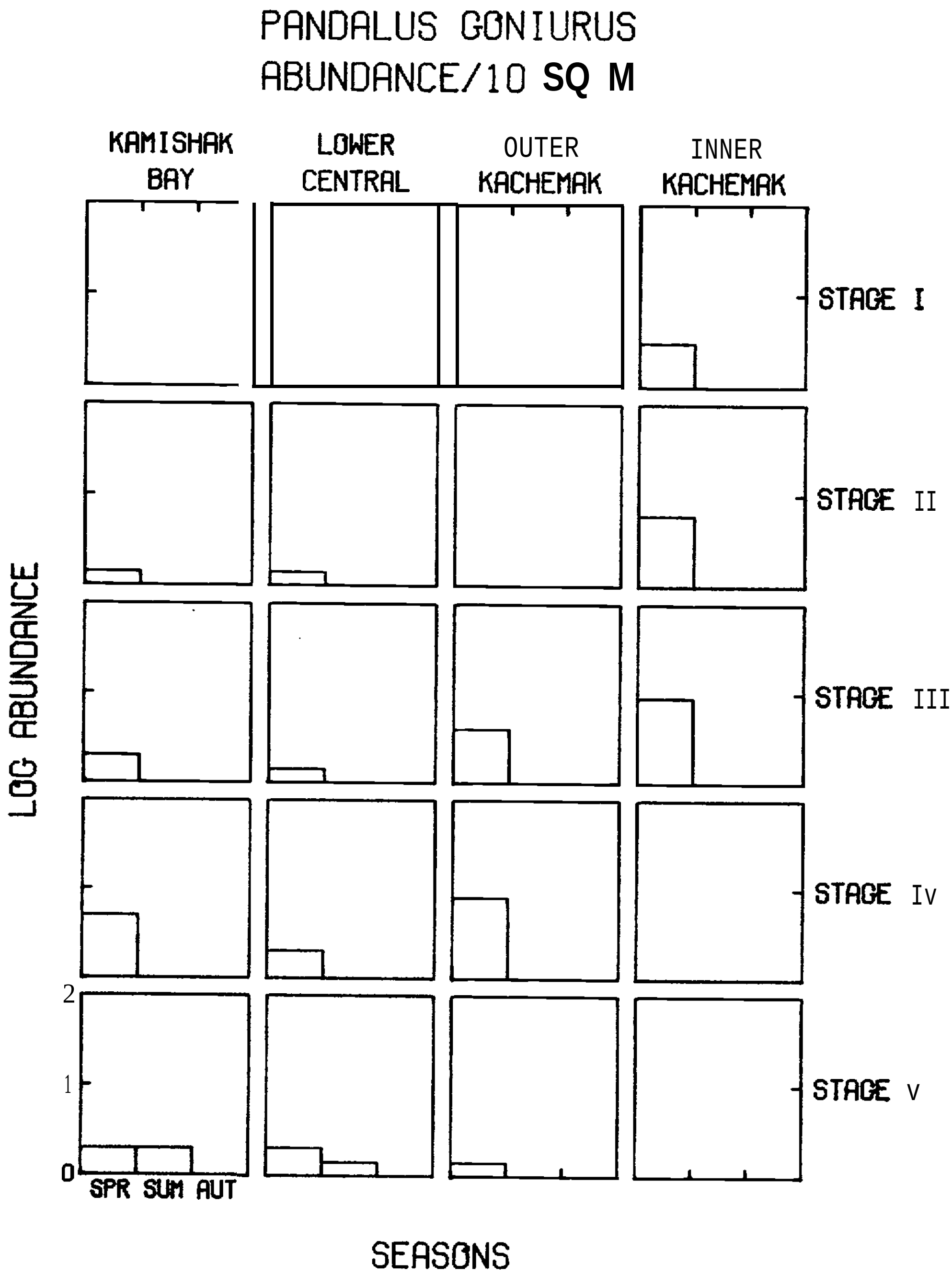
PARALITHODES CAMTSCHATICA
ABUNDANCE/10 SQ M

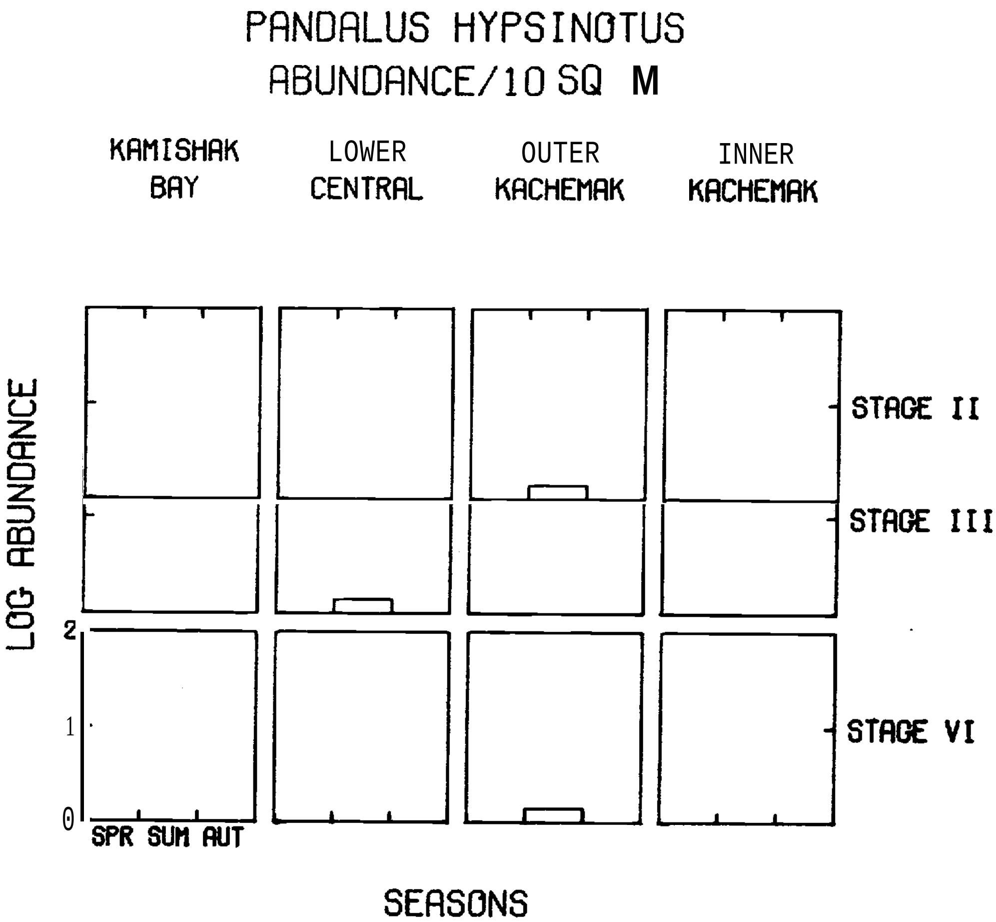


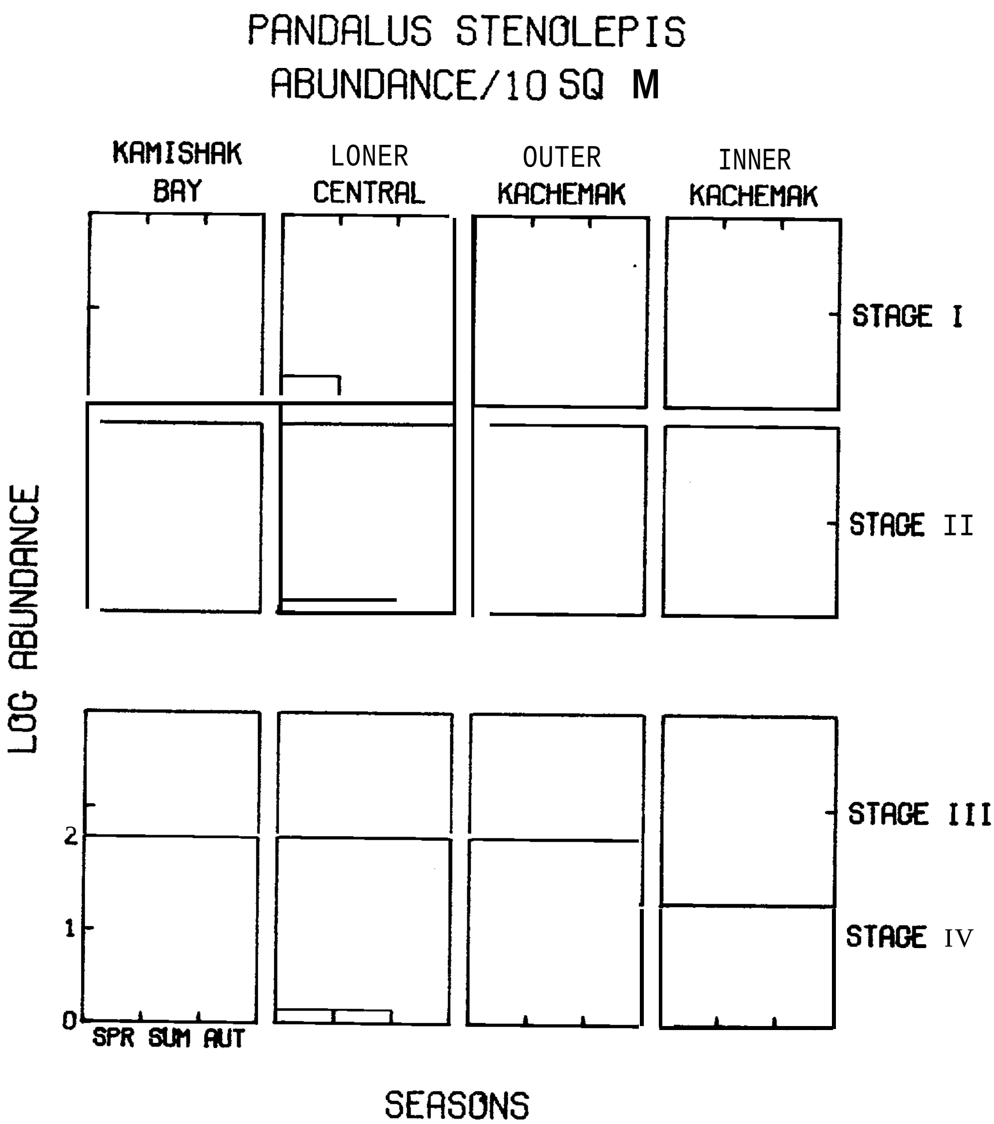

PANDALOPSIS DISPAR
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE I
STAGE II
STAGE III
LOG ABUNDANCE
2
1
0
SPR SUM AUT
SEASONS

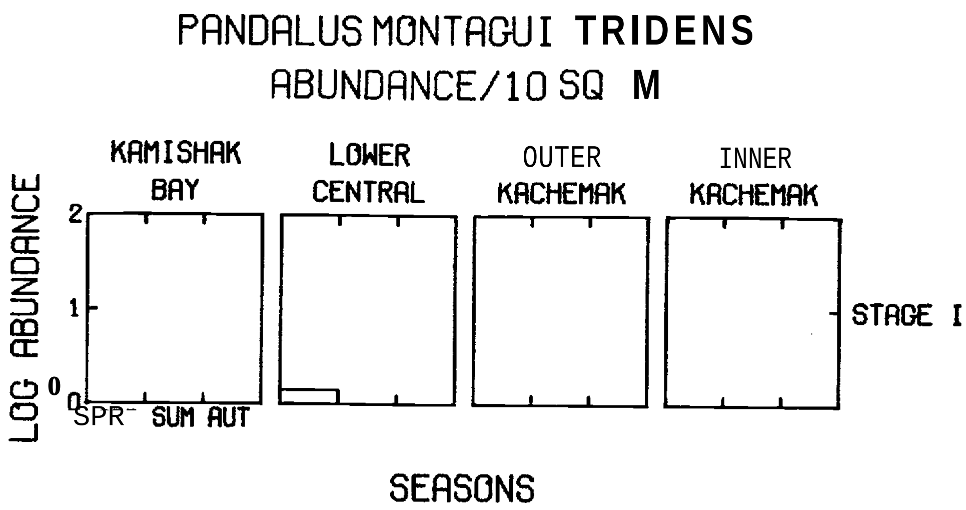

PANDALUS BOREALIS
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE I
STAGE 11
STAGE III
STAGE IV
STAGE V
LOG ABUNDANCE
2
1
0
SPR SUM AUT
SEASONS


PANDALUS DANAE
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE II
STAGE III
STAGE V
LOG ABUNDANCE
2
1
0
SPR SUM AUT
SEASONS


PANDALUS GONIURUS
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE I
STAGE II
STAGE III
STAGE IV
STAGE V
LOG ABUNDANCE
2
1
0
SPR SUM AUT
SEASONS


PANDALUS HYPSINOTUS
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
LOG ABUNDANCE
2
1
0
SPR SUM AUT
STAGE II
STAGE III
STAGE VI
SEASONS


PANDALUS STENOLEPIS
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
STAGE I
STAGE II
STAGE III
STAGE IV
LOG ABUNDANCE
2
1
0
SPR SUM AUT
SEASONS


PANDALUS MONTAGUI TRIDENS
ABUNDANCE/10 SQ M
KAMISHAK BAY
LOWER CENTRAL
OUTER KACHEMAK
INNER KACHEMAK
LOG ABUNDANCE
2
1
0
SPR
SUM
AUT
STAGE I
SEASONS